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ABSTRACT

This paper provides the description, documentation and users' and programmers' guide for the keyword out of context (KWOC) library indexing system, with coding references, program flow charts, program listings, procedure flow charts and instructions for maintenance and operation. (Author)

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USER'S GUIDE TO THE KEY-WORD-OUT-OF-CONTEXT (KWOC) INDEX

(HOW TO HARNESS THE KWOC)

MITRE WASHINGTON LIBRARY

by

W. R. Flury and D. Henderson

SEPTEMBER 1970

THE MITRE CORPORATION
Washington Operations

ABSTRACT

This paper provides the description, documentation and user's and programmers' guide for the keyword out of context (KWOC) library indexing system, with coding references, program flow charts, program listings, procedure flow charts and instructions for maintenance and operation.

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SECTION I

INTRODUCTION

The MITRE Corporation Policy and Procedures manual (L.1) states, "It is MITRE policy to provide a facility and an organization to acquire, control, store and retrieve information in the form of books, pamphlets, periodicals and reports, needed by MITRE in the prosecution of its mission." In implementing this policy the Washington Library recently instituted a Key-Word-Out-of-Context (KWOC) index for the technical reports collection. This paper provides some background information about the KWOC system; guides to the Library Staff, Technical Staff and Administrators on how to use the system; and programmer notes including flow charts and program listings for program maintenance.

What is a KWOC Index?

A KWOC index is a special form of index in which: (1) an entry is created for every substantive word in the report title, and (2) entries show the substantive word (keyword) and the portion of the context out of which the word was obtained. A sample of a KWOC index is shown in Figure 1.

A KWOC index is a special form of a Key-Word-In-Context (KWIC) index. Both KWOC and KWIC are based on the selection of keywords directly from the title alone or from a more complete bibliographic citation.

A more complete discussion of the theoretical background and the underlying structure of both KWOC and KWIC indexing is presented in Appendix I.

DEFINITION	MW7579	AN INTERACTIVE SYNTAX* DEFINITION FACILITY THESIS(MS) -FANES.R.S. SDF*
DEFINITION:	MW7513	BASELINE SYSTEM DEFINITION: URBAN GRAVITY-VACUUM-TRANSIT -EDWARDS.L.K.
DEFLECTION	MW7253	USE OF COANDA EFFECT FOR THE DEFLECTION OF JET SHEETS OVER SMOOTHLY
DEFLECTION	MW7254	USE OF COANDA EFFECT FOR THE DEFLECTION OF JET(S)* SHEETS OVER SMOOTHLY
DELIVERY	MW7304	JET DELIVERY OPTIMIZATION. FINAL-RPT. CONSTRUCTION* LIQUID-JETS*
DELPHI-METHOD*	MW3574	EXPERIMENTS IN GROUP PREDICTION(S)* -DALKEY.N.C. DELPHI-METHOD* /680300
DELPHI-METHOD*	MW3724	THE DELPHI-METHOD* AN EXPERIMENTAL STUDY OF GROUP OPINION -DALKEY.N.C.
DELPHI-METHOD*	MW3724	THE DELPHI-METHOD* AN EXPERIMENTAL STUDY OF GROUP OPINION -DALKEY.N.C.
DELTA-2	MW7329A	DELTA-2 AT MACH-NUMBERS* TO 1.65 AND COMPARISONS WITH WIND TUNNEL
DEMAND	MW7480	EVALUATION OF THE MEDLARS* DEMAND SEARCH SERVICE. INFORMATION-RETRIEVAL*
DEMAND	MW7493	THE QUEENS LONG ISLAND TRAFFIC* DEMAND MODEL. NEW-YORK* TRANSPORTATION*
DEMAND	WP7140	WORK STATEMENT ATTACHMENT FOR A DEMAND ACTIVATED BUS SYSTEM CONTRACT
DEMANDS	MW7191	TRAVEL DEMANDS IN 1990: EVALUATING FUTURE NEEDS. TRANSPORTATION* ROADS*
DEMONSTRATING	WP8444	TECHNIQUE FOR DEMONSTRATING CLUTTER ALLEVIATION TDS-NO.-161 -MULLIN.F.R.
DEMONSTRATION	MTR4128	SAFEGUARD BENCHMARK DEMONSTRATION PROGRAM DESCRIPTION .D-35 /700402
DEMONSTRATION	MW6035	MILITARY STANDARD: MAINTAINABILITY DEMONSTRATION /660200
DEMONSTRATION	WP9331	PERFORMANCE DEMONSTRATION FOR A SECOND GENERATION MEDLARS -GOSDEN.J.A.
DEMONSTRATION	WP9554(S)	SAFEGUARD DATA PROCESSING FEASIBILITY STUDY & DEMONSTRATION
DENTAL	W2222/SRI(C)	INSURGENT SUPPORT DENTAL MEASURES FOR SOUTHERN THAILAND
DEOXYGENATION*	MW7363B	DEOXYGENATION* /680500 *ILLINOIS-UNIV-URBANA-WATER-RESOURCES-CENT
DEPARTMENT	MW3889	ECONOMICS DEPARTMENT PUBLICATIONS 1948-1962 AN AUTHOR INDEX OF THE OPEN
DEPARTMENT	MW397A	PUBLICATIONS OF THE LOGISTICS DEPARTMENT -GRUSKY.J. -SCHNEIDER.R.ED.
DEPENDENCE	MW3582	A MATRIX TECHNIQUE FOR DESCRIBING REPORT DEPENDENCE IN INFORMATION
DEPLOYMENT	W2731/AFAL(S)	CONTINUOUS DEPLOYMENT OF DECOYS* FIRST INTERIM TECH RPT
DEPLOYMENT*	MW7470B	AUTOMATION* DEPLOYMENT* COMPUTERS* /690200 :ECAC-TN-006-36
DEPLOYMENT*	W2731/AFAL(SIA	-SMITH.E.H. -WRIGHT.F.L. DEPLOYMENT* MISSILES* FLARES* *AD393298
DESCENT	MW7339	HYBRID CONJUGATE(S)* GRADIENT-STEEPEST DESCENT ALGORITHMS* FOR
DESCRIBING	MW3582	A MATRIX TECHNIQUE FOR DESCRIBING REPORT DEPENDENCE IN INFORMATION
DESCRIPTION	MTR4128	SAFEGUARD BENCHMARK DEMONSTRATION PROGRAM DESCRIPTION .D-35 /700402
DESCRIPTION	MW7419	A DESCRIPTION AND DEFINITION OF SIMPLE AMBIT/G: A GRAPHICAL
DESCRIPTION	MW7450L	PROGRAM DESCRIPTION VOLUME-3 SIMULATION* SUBSYSTEM. THE NMCSSC
DESCRIPTION	MW7451L	PROGRAM DESCRIPTION VOLUME-2 PLAN GENERATION SUBSYSTEM PART-A
DESCRIPTION	MW7456L	GENERAL DESCRIPTION THE NMCSSC QUICK-REACTING GENERAL WAR-GAMING*
DESCRIPTION	MW7458L	PROGRAM DESCRIPTION VOLUME-1 DATA INPUT AND OUTPUT SUBSYSTEMS. THE
DESCRIPTION	MW7526A	TACTICAL DOCTRINE DIVISION THROUGH ARMY GROUP VOL-II DESCRIPTION OF THE
DESCRIPTION	MW7577	COLI A COMPUTER DESCRIPTION LANGUAGE PART-I THE NATURE OF THE
DESCRIPTION	MW7577A	DESCRIPTION LANGUAGE AND ORGANIZATION OF DESCRIPTIONS PART-III KINDS OF
DESCRIPTION	WP9574	DESCRIPTION OF NMCSSC* WORKLOAD -TAYLOR.S.B. -WOOD.D.C. COMPUTERS*

FIGURE 1
KWOC LISTING

Each index entry in The Washington Library KWOC index is generated from a technical report citation. The manner in which it is generated is shown in Figure 2. After such entries are generated for a collection of reports they are sorted and the KWOC output listing is generated. In this listing one line is printed for each index entry. The line contains the keyword on the left, and in the wider field on the right, the context out of which the keyword was obtained.

Is This A Standard KWOC Index?

No. The Washington Library has adapted the basic KWOC technique to the special circumstances that pertain there. Three adaptations have been made. Each is aimed at further improving the usefulness of the index in The Washington Operations environment. The adaptations are:

(1) multi-card citation input,

(2) input tagging, and

(3) input enrichment,

These adaptations, along with some of the rationale behind them, are discussed below.

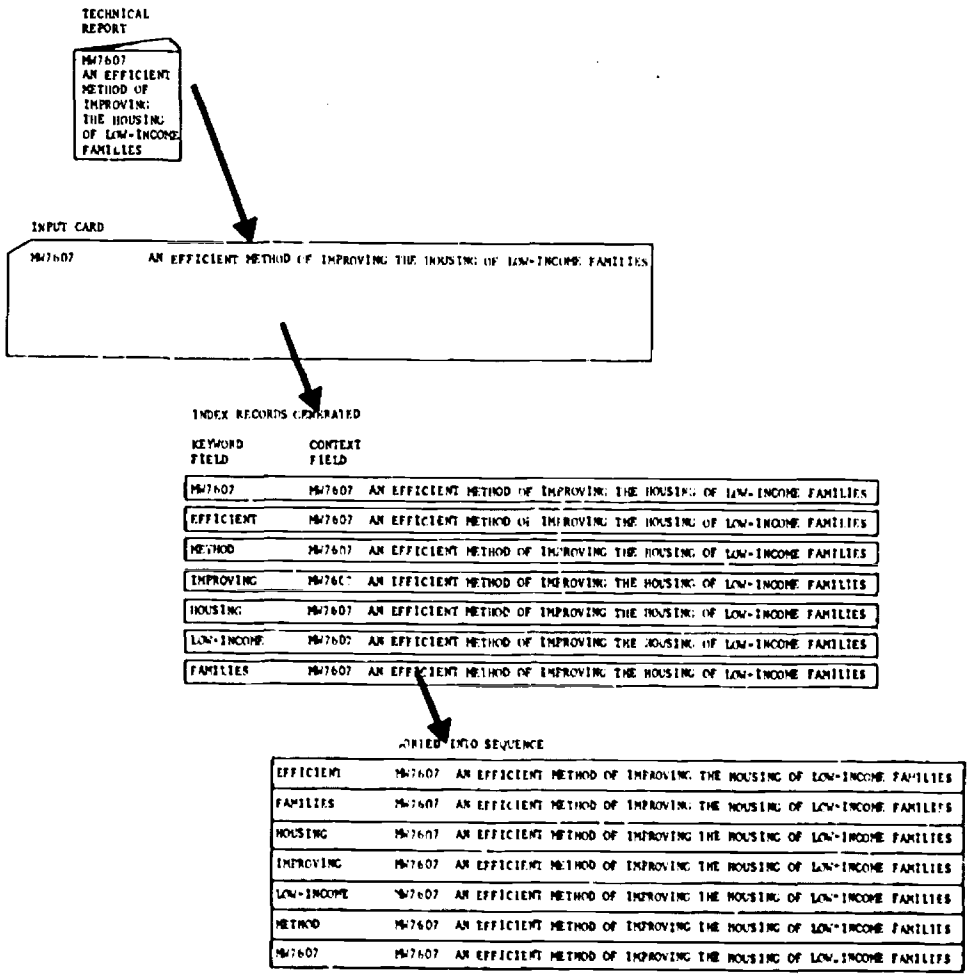


FIGURE 2
GENERATING A KWOC INDEX

Multi-Card Citation

A standard KWOC index uses a single card input per report. This normally allows the opportunity to input the report accession number and about 60 characters of the title. Over half of the technical reports received by The Washington Library have titles significantly longer than 60 characters. In order to assure the possibility of obtaining the full title on input, a multi-card citation input process was developed. Details of the process of preparing the input are presented in Section II under KWOC Input Processing.

In addition to assuring input of the full report title, the multi-card citation input readily permits the addition of any other desired information for indexing purposes. During development of the KWOC index various elements in Washington Operations desired to include 8 other reference entries:

- Author
- Corporate Source
- Corporate Report Number
- Date
- Other Identifying Number
- Department Number
- Contract Number
- Task Number

With the number of input cards substantially unlimited it is possible to include all of these and others if this is desired in the future.

Input Tagging

Tagging is a feature of the Washington KWOC index which was developed at MITRE to overcome a basic KWOC format problem. Users o both KWIC and KWOC indexes have found it annoying to scan down the l of keywords and find authors' names, department identifiers and originators' document identifications intermixed in the listing sequenc with keywords from titles. This problem is further complicated, in the case of The Washington Library, by a requirement to include in t index the many other items of bibliographic information, along with titles. Many of these are alphanumeric and would, normally, sort in sequence with title keywords in the output listing.

The solution developed for this problem begins with assigning special character tags to be prefixed, on input, to each of the non-title items desired in the index. See Table 1. These tags are carri by the system through the keyword sorting process. Since the tags are in the high-order (left-most) position for the index sort, they force like items together. After sorting, the print program deletes the tags from the left margin field but leaves the sorted records in the sequence in which they were put before the tags were deleted.

The resulting output is, thus, divided into 10 major segments corresponding to the 10 types of tags and the 10 items of interest. Title words appear in the subject index section; authors' names all appear together and in alphabetic sequence; dates appear together and in sequence from earliest to most recent and are not intermixed with project numbers, and so on.

TABLE I

ITEM DESIRED FOR CITATION

ITEM	EXAMPLE	TAGGED FORM
Title	Growth of Urban...	Growth of Urban
Author(s)	Jones, J. P.	-JONES, J. P.
Corporate Source	RAND	*RAND
Corporate Report Number	P-1234	:P-1234
Date	680929	/680929
AD, PB or NASA Number	AD 123 456	=AD123456
Department Number	D-31	.D-31
Contract Number	F19(628)-68-C-0365	+F19(628)-68-C-0365
Project or Task Number	31.5.0	%31.5.0
Accession Number		
Internal documents (3 different series)	WP1234	•WP1234
	MTR 456	•MTR456
	M67	•M67
External	MW 2468	•MW2468

NOTES: The black dot • is used in the above illustration as a visible substitute for a numerical quantity, hexadecimal 00, for which no printable 360 character has been assigned. This quantity is automatically prefixed to the accession number by the KWOC program. When the accession numbers are printed, the unprintable character does not print and a blank appears in its place.

One bonus of this approach is the ability to reconstitute the multiple input card images in their original sequence, at the beginning of the listing. The basic conditions to permit this are set when the accession numbers, treated as keywords, are pulled together by their tags and sequenced. Since every citation normally requires two to three cards of input, a convention was established to enter the accession number first on each card and to suffix card sequence letters to the accession number on each card as required. The result, after keyword sorting, is the complete citation as originally entered.

The basic citation section of the listing is bound separately from the others and used side-by-side during searches of the other portions of the index. This separate list is especially useful when the context from which the keyword was obtained (the content of the card on which it appeared) happens not to include the other items with which the user is trying to coordinate the term he is accessing. See Section III for more details on the use of the basic citation listing.

Input Enrichment

Another standard objection to conventional KWOC indexing centers around the problem of non-informative titles, titles which do not contain good, descriptive keywords. As a hedge against lost information, it was decided for this application to enrich the basic KWOC citation with human indexing. Enrichment, in this application, is defined as the adding of extra index terms which do not appear in the title or with the other standard bibliographic data in the document.

In the input processing stage of the system, all of the basic citation information is obtained from the document by a library aide.

The professional indexer scans this for accuracy and also makes a determination as to whether or not the title is properly descriptive. If enrichment is deemed desirable, the indexer adds extra terms to the input record and suffixes them with an asterisk. The indexer is also encouraged, when time permits, to highlight particularly descriptive terms in the title. These are also indicated with the suffixed asterisk.

Additional Background Information

The KWOC index is currently being used with a collection of over 10,000 technical reports growing at a rate of approximately 6,800 per year. Report subject matter is varied representing the combined interests of 370 technical staff members working on diverse military and civilian systems engineering problems. The rest are internally generated. Of the former, about two-thirds are obtained from the Defense Documentation Center (DDC) or the National Technical Information Service (formerly the Clearinghouse-CFSTI). The others are obtained directly from the originating organizations.

The system is based on use of three programs run on the IBM 360/50 in a multi-programming mode under OS 360, Version 18 with HASP (Houston Automatic Spooling Processor, an I/O expediting feature). The programs are: KWOC1, which generates the basic index record; the Sort-Merge utility program of OS 360, and KWOC2 which prints the output. These three programs are used to prepare and check the newly indexed material weekly. After checking, newly indexed records are

accumulated and, periodically, inserted into the master file with the Sort-Merge utility under Job Control Language (JCL). The master file is currently printed in its entirety at the same time.

Weekly cumulative index, sort and print runs for up to 800 documents require less than 5 minutes of computer time. Master file merge and print runs, printing the complete index, have not yet exceeded 12 minutes of charged computer time.

SECTION II

PROCESSING IN THE LIBRARY

How Incoming Reports are Processed

The flow of technical reports through the Library accessions and indexing processes is shown in Figure 3.

Accessions Process

Almost all technical reports in the library are obtained at the request of members of the MITRE Technical Staff. When requesting a report the staff member completes form MCF 1825, 9/70 Figure 4. From this form the library takes the bibliographic information, and, if the report is not already in the collection, submits an order to the appropriate supplier. Request forms are filed in a pending request file (ringbinder) until fulfilled by receipt of the report.

KWOC Input Processing

When the requested report is received the request form is removed from the binder by the library aide. The aide then handwrites* such information as can be readily obtained from the request form onto a 5x8 Bibliographic Record Card (sometimes called Shelf List Card). See Figure 5.

The partially completed Bibliographic Record Card is next given to the indexer. The indexer checks the aide's work and completes any portions of the bibliographic entry which the aide was unable to

*Handwritten entries on the form are currently specified as a work saving measure. Since all of the information on the form later appears in the computer printed KWOC output, and since the Bibliographic Record Card is used primarily as a filed record the handwriting of this record constitutes no significant legibility problem.

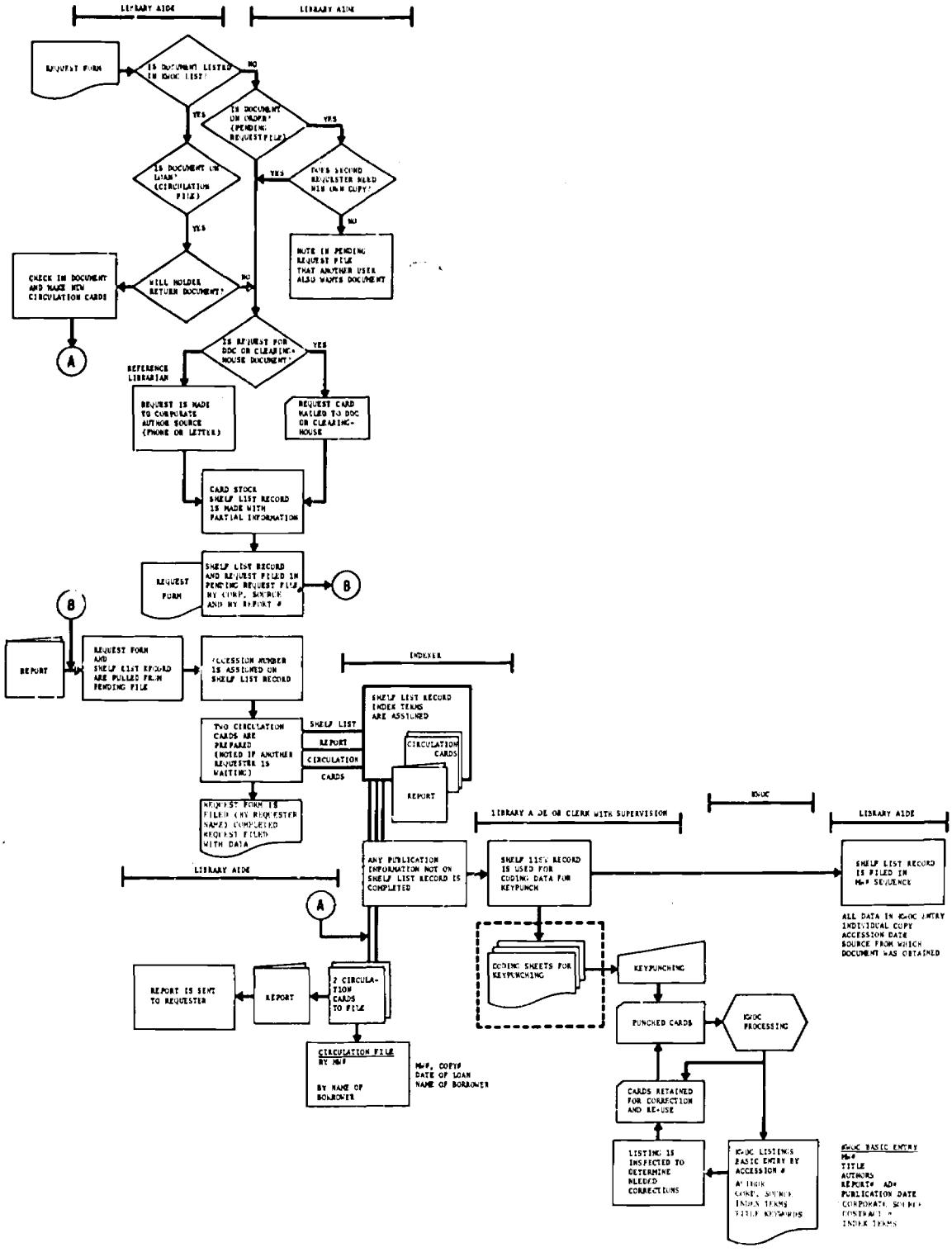


FIGURE 3
WORK FLOW
TECHNICAL REPORTS ACCESSION & INDEXING

MITRE/WASHINGTON LIBRARY

OPEN LITERATURE COLLECTION REQUEST

Use separate form for each item requested, filling in ONLY blanks applicable

LIBRARY USE ONLY

Call # _____ Date Ord _____

PR No. _____ Price _____

Supplier _____

Requester J. J. SMITH

Dept. D-31 Mail Stop # W-AAA

Tel. Ext. 2222 Date 10/14/70

If item not received by 15 JAN 1971 cancel request

BOOK, HEARING & PAMPHLET

Author(s) OLSEN, E.O.

Title AN EFFICIENT METHOD OF IMPROVING THE HOUSING OF LOW INCOME FAMILIES

Year DEC '69 Publisher RAND

JOURNAL ARTICLE

Title _____

Vol. & Date of Journal _____

Page (s) of Journal Article _____

SUBSCRIPTION

Title _____

Publisher _____

Period the Subscription is to begin _____

Material is definitely available at the following outside source RAND

ADDITIONAL REQUIREMENTS FOR OBTAINING --

BOOKS (check box)

☐ Inter-library loan only

☐ Order for library collection. Send to requester on 2 wk. loan. Subject to renewal and to recall.

☐ Order for requester on extended loan of 3 months (subject to renewal and recall) NOTE: Must have approval of sub dept. head or manager's signature.

SUBSCRIPTIONS (check box)

☐ Order for library collection. To be sent to the library.

☐ Order and have sent direct to requester. (Requires your department head signature)

_____ _____

Sub Department Head or Manager's Signature *Department Head Signature*

MCF 1825 9/70 LIBRARY COPY

FIGURE 4
REPORT REQUEST FORM

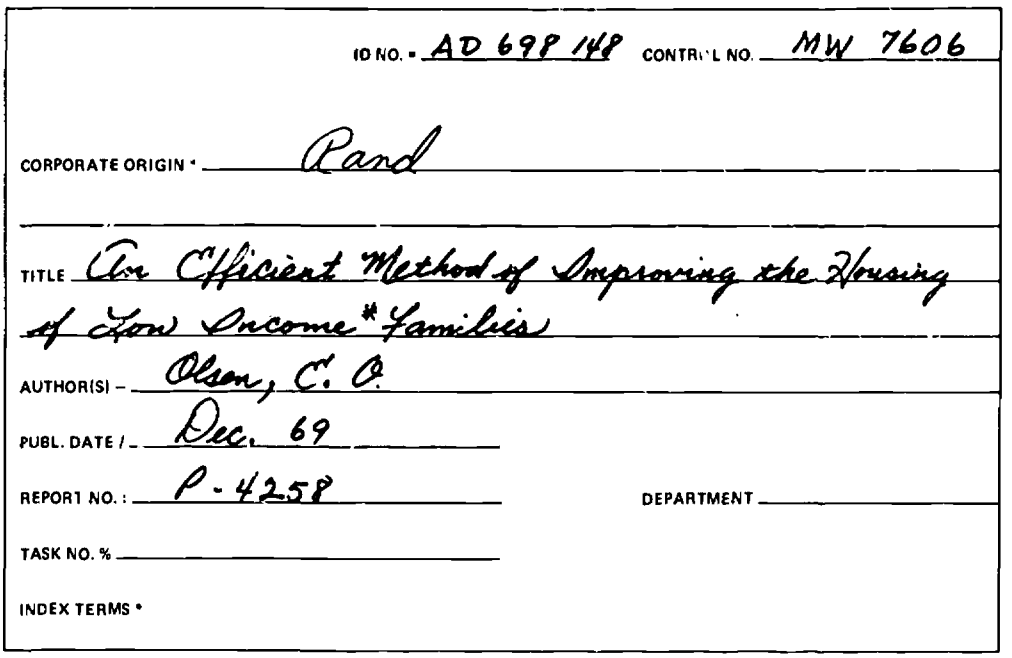


FIGURE 5a
LIBRARY SHELF LIST CARD, SIDE 1

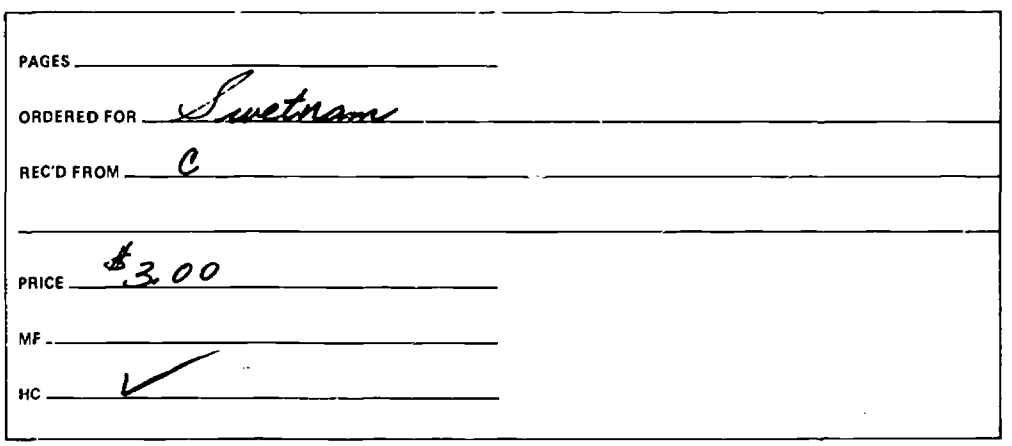


FIGURE 5b
LIBRARY SHELF LIST CARD, SIDE 2

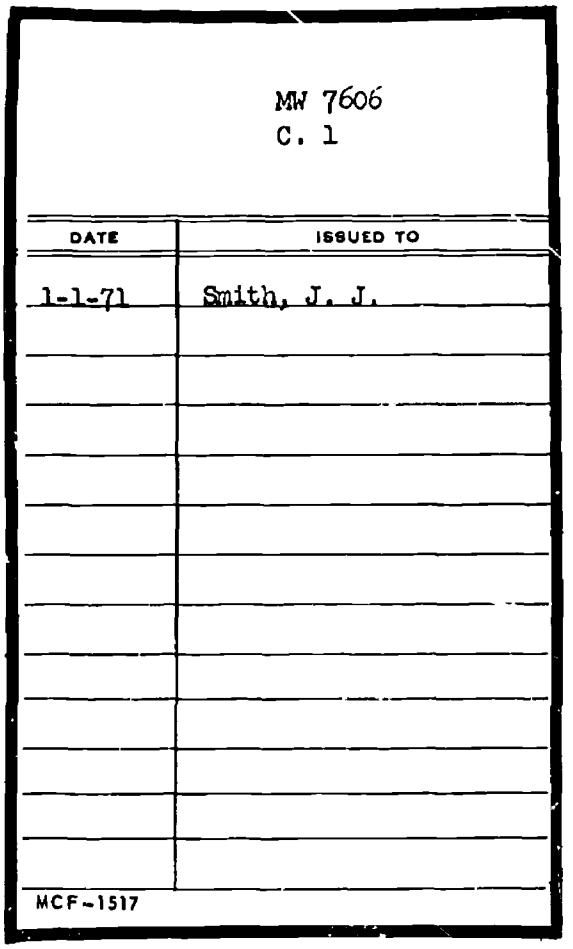


FIGURE 6
REPORT CIRCULATION CARD

complete. The indexer, at this point, may determine that the contents of the document are not adequately described by the terms in the title. In such cases the indexer assigns additional terms and records them on the Bibliographic Record Card in the appropriate place. Descriptive terms assigned by the Indexer follow the standards suggested in Standard for Descriptive Cataloging of Government Scientific and Technical Reports Revision 1, AD #641092, October 1966. Index terms assigned by the indexer are taken from The Thesaurus of Engineering and Scientific Terms, First Edition, Engineer's Joint Council, New York, December 1967, or later editions as available. The indexer may also consult other guides such as the latest edition of the NASA Thesaurus.

Upon completion of this stage of processing the technical report is charged out to the requester. Two circulation cards (Figure 6) are filed, one by library accession number and one by borrower name. The request sheet is filed in a binder of completed requests, by requester name. The Bibliographic Record Card is returned to the aide who uses it as a source document for transcription of the information onto a keypunch coding sheet. The rules for coding for keypunching are fully described in Appendix II, Reference Data for Coding KWOC Input. See Figure 7 for sample of the completed keypunch coding sheet. After coding, the Bibliographic Record Card is filed by accession number as a permanent Shelf List record. The coding sheets are sent, in daily batches, to the MITRE Washington Computer Center (MWCC) for keypunching.

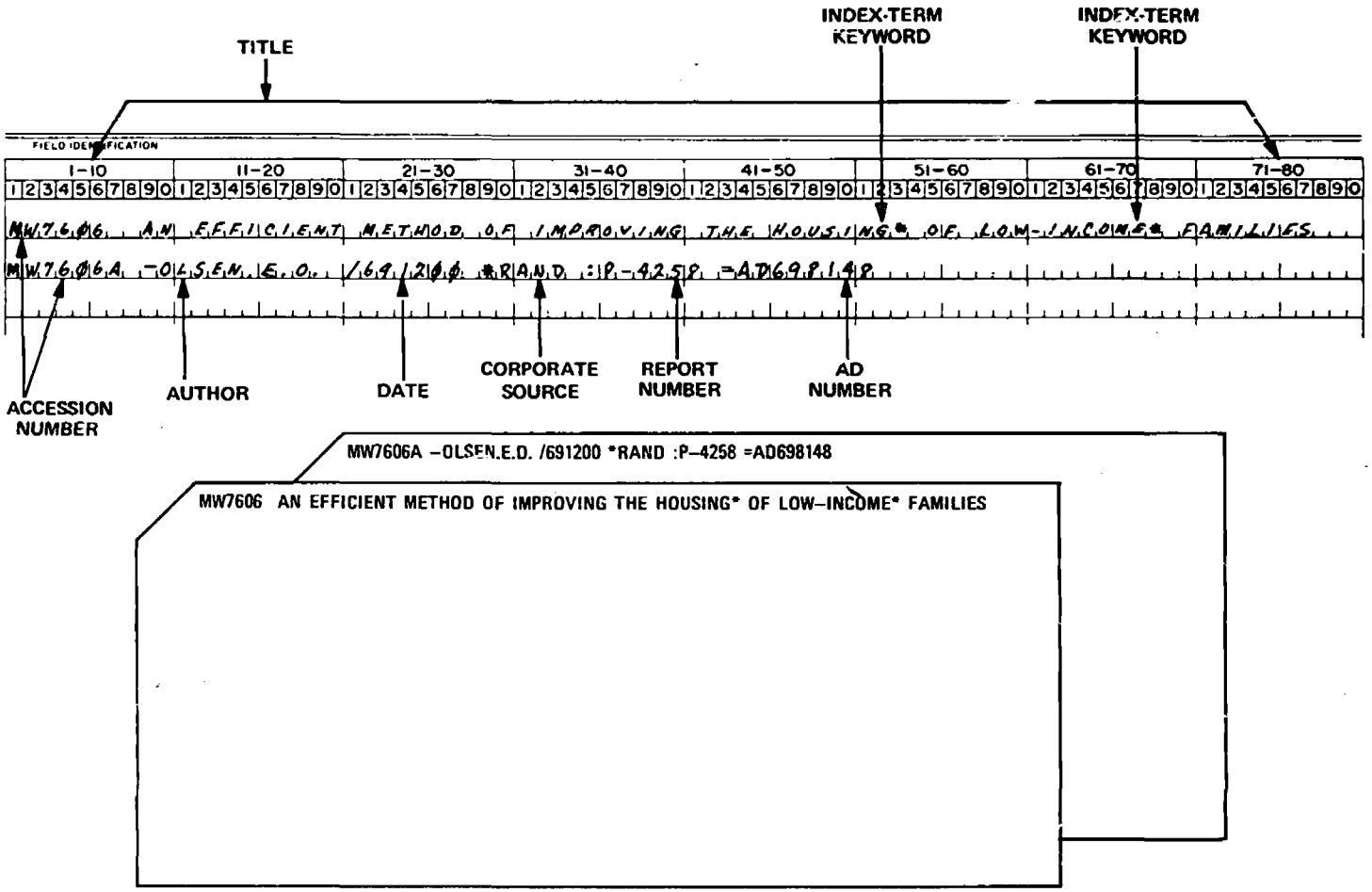


FIGURE 7
CODING AND KEYPUNCHING KWOC DATA

How KWOC Reports Are Produced

In producing the various KWOC outputs two computer procedures are used. One of these is usually run once a month and is called "Monthly Run." This run consists of two jobs run together. They are called CUMULIST, Job 1 and PRINT, Job 2. See Figure 8 for a flow chart. The first job accepts as input the cards for all of the new accessions during the previous month. It prepares index records for these cards and sorts them. It then produces an output listing of these records in standard KWOC format. This output is printed on white paper for reproduction as a Working Paper and for distribution to the Technical Staff as a current awareness service.

In the second part of the monthly run the sorted index records from the first part of the run are merged with the index records in the master file on magnetic tape. This job then produces a listing of the total KWOC index including all records ever entered. This is printed on three part paper (or three times at the Library's option) on striped paper. These outputs are used as the current working copies in the Library processing area, in the Library reading room and in the Bedford Library.

The other major run is performed once a week and is called "Weekly Run." See Figure 9 for a flow chart. This run accepts as input the cards representing all accessions since the last monthly run. In the first week after the monthly run it operates with one week's accessions; in the second week, two weeks' accessions; and so on. This run also

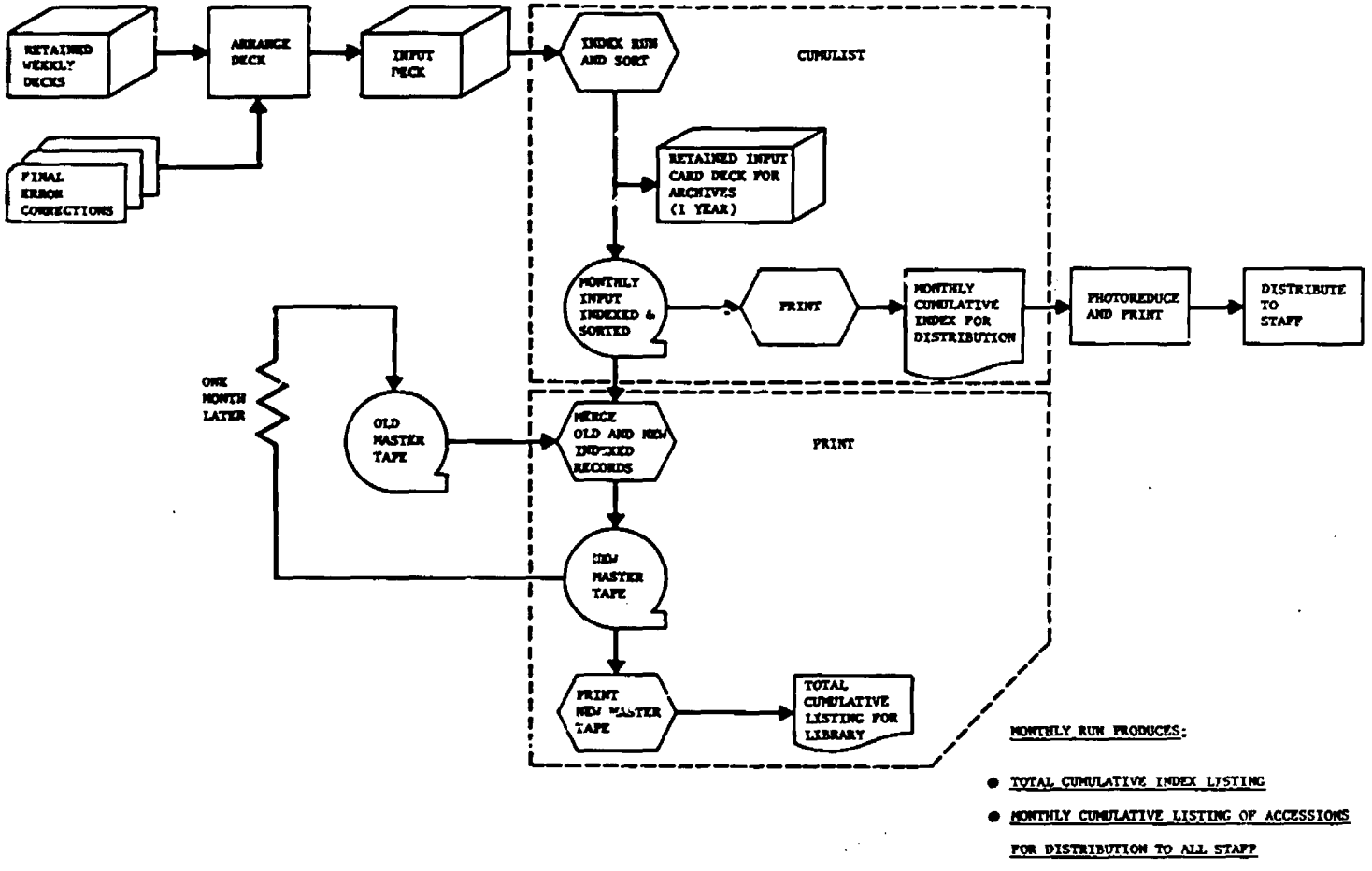


FIGURE 8
FLOW CHART FOR MONTHLY ACCESSIONS PROCESSING

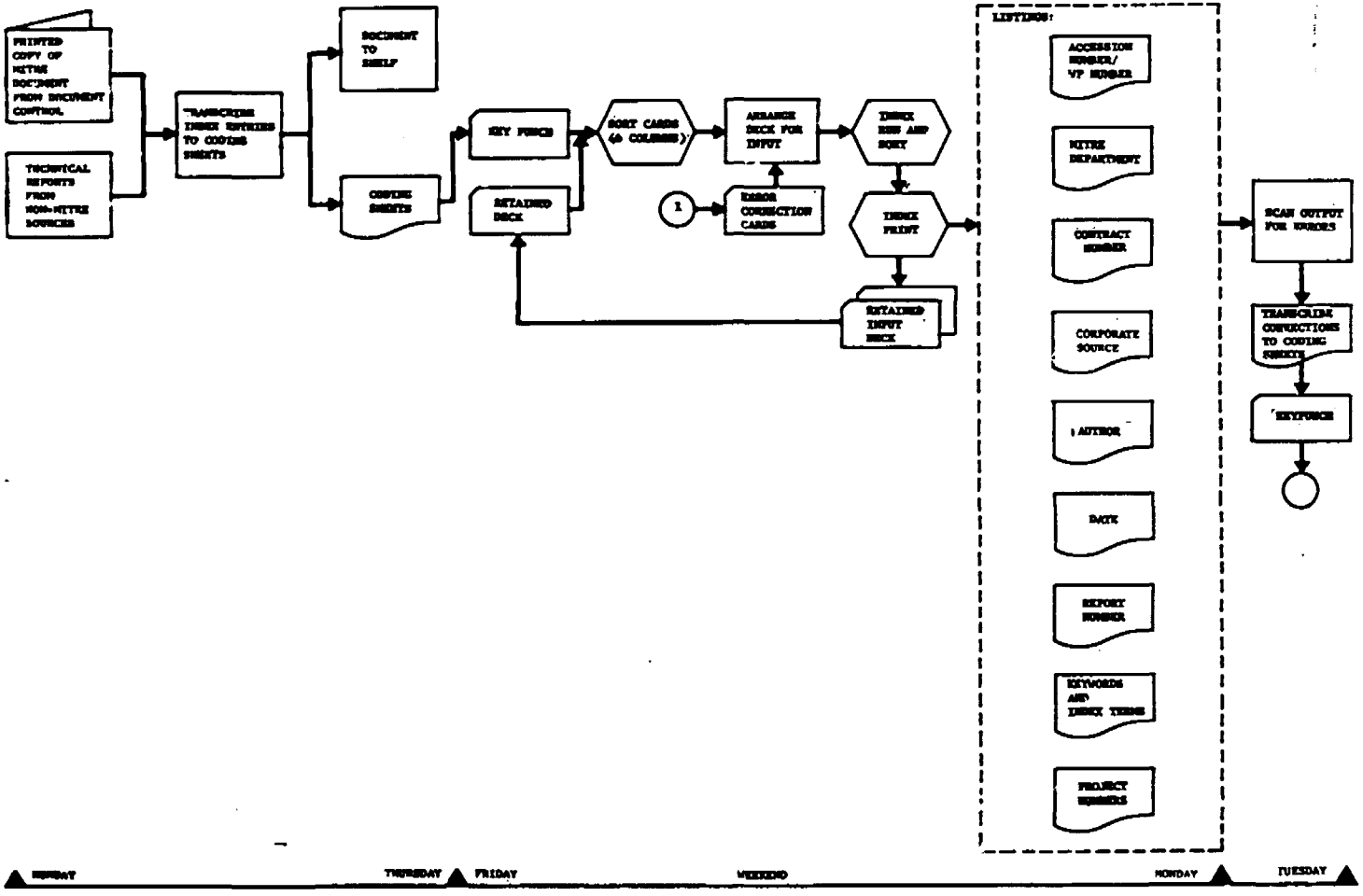


FIGURE 9
FLOW CHART FOR WEEKLY ACCESSIONS PROCESSING

consists of two job steps. The first, KWOC1, indexes all of the input records, sorts them and creates an output data set for printing. The second step, KWOC2, prints the records in standard KWOC format. The output is printed on striped paper. It is used by the library aide and the indexer to check the input to KWOC for errors. It also serves as the current cumulative accession list supplement until the next monthly run.

Another run called CHECKOUT is used to aid in checking any set of input cards which has never been run before. It is very similar to the weekly run. See flow chart in Appendix III. It is normally used to check the fourth week's input to the monthly run prior to its entry as input to the monthly run.

The detailed procedures for obtaining the Monthly and Weekly Runs are described in Appendix III.

SECTION III

HOW TO USE KWOC

The main purpose of KWOC is to permit staff members to locate and obtain technical reports in the library easily and efficiently. The KWOC index can also provide certain valuable information directly without obtaining any reports. In order to locate a report, the KWOC user must: (1) search the KWOC listing for the appropriate entries; (2) extract the report accession numbers; and then (3) obtain the desired report from the library staff. If the user is just interested in obtaining information about reports he needs only to search the index and obtain the information directly from the listing.

Locating a Report - Single Term Search

When trying to locate and obtain (retrieve) a report from the library the staff member may use either a single term search strategy or a multiple term search strategy. In a single term search the KWOC user must have in mind one of the following:

- any significant word in the title
- the name of any of the authors
- the name of the organization that produced the report
- an index term under which the report is likely to have been indexed (by the Library indexer)
- the originating organization's report number

- the task number under which the report was produced (MITRE documents)
- The Department number of the originating department (MITRE documents)
- the DDC identification number (AD Number)

With any one of these the user can scan the listing at the appropriate point and locate all the reports indexed under that one keyword or term.

For example, to find a specific item, DDC Report AD681472, a searcher looks in that section of KWOC that lists AD number (Figure 10). Here he will find that AD681472 has been accessioned under MW3210. To order a copy of the document, the searcher merely asks the Library staff for MW3210. If he wishes to know the full title of the document, the searcher may then turn to the bibliographic citation section.

Locating a Report - Multiple Term Search

When performing a single term search on the AD number or the originating orgsnization's report number the user will find (if he finds anything under that number) only one report for each index entry. When searching on other terms the user may find more than one report for each term. For example, the KWOC index will list many reports under the keywords "COMPUTER" and "SYSTEM." If the user is looking for just one report or just a few reports from among those he can ease the search by thinking of one or more other terms under which

FIGURE 10
AD NUMBER SEARCH

the report might be indexed and using them in a multiple term search. In most cases the user will find the reports he is looking for just by looking up the other terms and scanning the index entries associated with those terms. A user looking for reports on design of on-line systems would do best to search first under the least common of the three terms, on-line, and scan the entries for the more common words design and system. The user who does this will find entries such as:

ON-LINE	MW4307	AN ON-LINE DEBUGGER FOR OS/360 ASSEMBLY LANGUAGE PROGRAMS -JOSEPH.W.H.
ON-LINE	MW4355	DESIGN CONSIDERATIONS FOR AN ON-LINE MANAGEMENT SYSTEM
ON-LINE	MW7502	DOCUMENT VECTOR MODIFICATION IN ON-LINE INFORMATION-RETRIEVAL* SYSTEMS
ON-LINE	MW8059	EVALUATION OF USER REACTIONS TO A PROTOTYPE ON-LINE
ON-LINE	TM5025	PROPOSED DESIGN FOR AN ON-LINE INFORMATION RETRIEVAL SYSTEM -KINNEY.O.R.
ON-LINE	WP9005	PRELIMINARY DESIGN NOTES FOR TRANSPORTATION ON-LINE PLANNING TOP) SYSTEM
ON-LINE	WP9221	TECHNICAL DESIGN APPROACH TO SASM ON-LINE PLANNING SYPPORT -MAYER.R.P.
ON-LINE	WP9229	2250 SERVICES PROVIDED BY STAGE-2 OF THE MITE ON-LINE SYPPORT SYSTEM

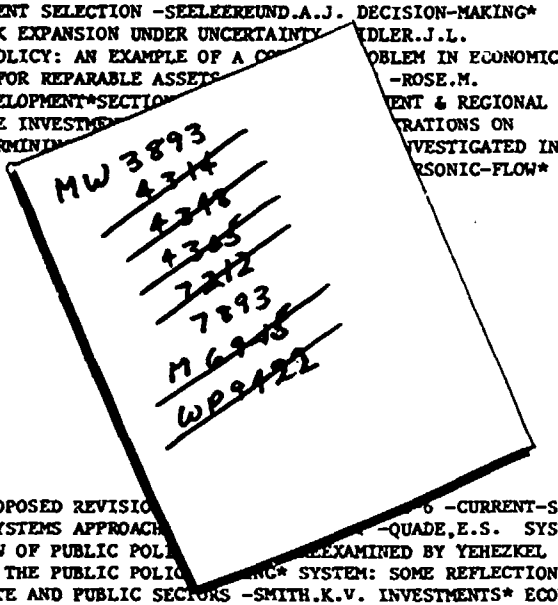
It does not always occur, however, that the several terms the user wants to associate in a multiple term search will appear in the same index entry. Sometimes they do, in such entries as MW4355, TM5025, and WP9005. Some titles are very long, however, and carry over to another input card. Entries MW8095, WP9005, and WP9229 carry over. Since each card is treated independently, related keywords may appear in separate entries. The key to coordinating such keywords lies in making effective use of the report accession number to tie them together.

Suppose a user wants to obtain all reports held on public investment policy. Translated into search terms this means that he wants all reports indexed under the keyword public which are also indexed under investment and are also indexed under policy.

The basic technique used to perform such a search is to enter the index with the least likely keyword and list all of the accession numbers for entries under that term. Then, the user goes to the next least likely term and looks for entries with accession numbers the same as on the initial list, crossing out all that are not found among the entries. Then, on the next term for the same operation, and on and on until the search is completed. The remaining list of accession numbers represents the set of reports which satisfies the search. In the example shown in Figure 11 the user has gone first to the keyword investment and has listed all of the accession numbers for reports indexed under that keyword. Then, after noting these, he has gone to the index entries for the keyword public and has crossed off all accession numbers from the investment list not found under the entries for public. The two remaining entries, MW3893 and MW7893, could then be checked against the entries for the keyword policy, but, since there are only two it is easier just to go to the complete citation section of the listing and read the complete entries for both documents.

This basic, list preparation approach can be used for any multiple term search. Other logical combinations of terms can be used in searching. The search illustrated in the figures required

```
INVESTIGATIONS          WP9472A  INVESTIGATIONS -BARDSLEY.P.P. .D-31 /690425 Z31.6.0
INVESTMENT              MW3893   RANKING AND SELECTION METHODS FOR CAPITAL INVESTMENT DECISIONS IN
INVESTMENT              MW4314   CRITERIA FOR INVESTMENT SELECTION -SEELEEREUND.A.J. DECISION-MAKING*
INVESTMENT              MW4348   INVESTMENT IN NETWORK EXPANSION UNDER UNCERTAINTY  IDLER.J.L.
INVESTMENT              MW4365   OPTIMAL INVESTMENT POLICY: AN EXAMPLE OF A CO      OBLEM IN ECONOMIC
INVESTMENT              MW7212   AN INVESTMENT MODEL FOR REPARABLE ASSETS           -ROSE.M.
INVESTMENT              MW7893   SECT-3A ECONOMIC-DEVELOPMENT*SECTION               ENT & REGIONAL
INVESTMENT              M69-15   COMPUTER USAGE IN THE INVESTME                     RATIONS ON
INVESTMENT              WP9422   A PROCEDURE FOR DETERMININ                         VESTIGATED IN
INVISCID                MW4124   A MOMENTUM* ANALYSIS                               RSONIC-FLOW*
```




```
PUB-6                   WP9249(C)  PROPOSED REVISIO                    6 -CURRENT-SITUATIONS-TEAM
PUBLIC                  MW3625   THE SYSTEMS APPROACH                  -QUADE,E.S.  SYSTEMS-ANALYSIS*
PUBLIC                  MW3739   REVIEW OF PUBLIC POLI                 EXAMINED BY YEHEZKEL DROR, CHANDLER
PUBLIC                  MW3741   PPB & THE PUBLIC POLIC                NC* SYSTEM: SOME REFLECTIONS ON THE PAPERS
PUBLIC                  MW3893A  PRIVATE AND PUBLIC SECTORS -SMITH.K.V. INVESTMENTS* ECONOMICS*
PUBLIC                  MW4230   DIRECTED RESEARCH CENTERS AND PUBLIC PROBLEMS -ALESCH.D.J.
PUBLIC                  MW4312   BACKGROUND OF PUBLIC SYSTEMS MANAGEMENT -NOVICK.D. BUDGETING*
PUBLIC                  MW7134   PUBLIC FACILITIES AND SERVICES INVENTORY QUESTIONAIRS* PUBLIC-FACILITIE*
PUBLIC                  MW7461   AIR-FORCE FILM DIRECTORY: DIRECTORY OF AF FILMS: CLEARED FOR PUBLIC AND
PUBLIC                  MW7806   STRATEGY & ORGANIZATION IN PUBLIC LAND POLICY -HALL.G.R. *RAND :P-3403
PUBLIC                  MW7893   SECT-3A ECONOMIC-DEVELOPMENT*SECTION-3.  PUBLIC INVESTMENT & REGIONAL
PUBLIC                  M70-2    A PROPOSED PROJECT-PLAN FOR A PUBLIC VEHICLE RENTAL-SYSTEM -MARINO.J.J.
PUBLIC                  WP1192   DRAFT FUNCTIONAL REQUIREMENTS OF A PUBLIC AUTOMOBILE RENTAL SYSTEM
PUBLICATIONS            MW3978   PUBLICATIONS OF THE LOGISTICS DEPARTMENT -GRUSKY.J. -SCHNEIDER.R.ED.
```


FIGURE 11

MULTIPLE-TERM SUBJECT SEARCH

that all terms be present. It used what is called AND logic (this term AND that term AND some other term must all be present). OR searches (this term OR that term, etc.) may also be constructed by the user. For these, the accession number list obtained under any term is added to the list under the other terms. Multiple term searches may be performed using any number of terms, combining them in any manner desired. Careful use of this method and careful "jotting" of the list can save a lot of time in looking for reports in common subject areas.

The Library indexer has developed a technique for speeding up multiple term searches by providing some pre-coordination of index terms. This is done by linking index terms with hyphens. The title, "THE UNIFORM DATA ELEMENT DESCRIPTION," for example, is indexed by standard KWOC techniques under UNIFORM, DATA, ELEMENT, and DESCRIPTION. The indexer, in the improved procedure, enriches the input by entering the additional term DATA-ELEMENT*. This type of linking is also used to hold together the sets of character strings which make up the full name of the corporate source: (for example: *SOCIETY-OF-AUTOMOTIVE-ENGINEERS). Multiple term searches of the index can be made more quickly when the searcher can enter the index looking for the complete term, DATA-ELEMENT*, in one place rather than having to coordinate all of the entries for DATA with all of the entries for ELEMENT.

Retrieving Information

The KWOC Index can also be used to retrieve information. For example, staff members can obtain a list of all the documents they have published by looking in the author section of the KWOC listing. See Figure 12. A KWOC user interested in seeing what type of reports we have been getting from RAND recently can look under the RAND entry in the Corporate Source section of the listing. The user, usually with the help of the Library staff, can also prepare bibliographies on any single term or any combination of terms. All of the information required can be obtained from the index without retrieving the actual reports.

The possibilities for information retrieval from KWOC are limited only by the imagination of the user and the time available to search for and compile the information.

FIGURE 12
AUTHOR SEARCH

SECTION IV

A PROGRAMMER'S OVERVIEW OF KWOC

Brief program descriptions and some comments on special features are given in this section. Full supporting documentation (flow charts, program and procedure listings) is given in Appendix IV, Programmer's Handbook for KWOC.

Basic Programs

The system is based on use of three programs run on the IBM 360/50 in a multi-programming mode under OS 360, Version 18 with HASP (Houston Automatic Spooling Processor, an I/O expediting feature). Detailed flow charts of all programs are contained in Appendix IV. Listings are presented in Appendix V.

The first program, KWOC1, written in assembly language: reads input cards; identifies character strings of two characters or more; compares these strings against stop list terms: and if the string is not on the list (and is, therefore, a KWOC keyword), creates an index for the string. These records are in the same format as the print line. Each record, in fact, is one full line of the output. The KWOC indexing program requires approximately 300 instructions. It presently conta 400-word stop list suggested by Williams in his book.* Th ogram, when link-edited, requires 46k bytes.

*W. F. Williams, s of Automated Information Retrieval, The Business Pre st, Ill., 1965, pp. 126-129.

The output of KWOC1 is sorted by the Sort-Merge utilities called by Job Control Language (JCL) statements. Records are sorted on the first 40 characters. This includes the keyword field and the first 17 characters of the context field.

The basic print procedure uses the Tape-To-Print utility called by JCL. A slightly more sophisticated assembly language print program has been written. This program, KWOC2, reads the sorted output of KWOC1; deletes records containing certain tags, if suppression of those records is desired; deletes tags from the keyword fields; and prints using normal pagination controls. This program, when link-edited, requires 48k bytes.

These three programs are used to prepare and check the newly indexed material weekly. After checking, newly indexed records are accumulated and, once a month, inserted into the master file with the Sort-Merge utility under JCL. The master file is printed periodically with KWOC2.

Special Features

1. Character string separators - any number of blanks, up to four, or a comma are interpreted as a break in the input character string. Each string of characters between such separators is considered a potential keyword to be checked against the stop list. More than four blanks separating character strings are interpreted as the end of the text on the card.

2. Stop List - this presently consists of a table of 400 common words not useful for indexing. It is possible to extend this list (or shorten it) by altering the table in the program. No term included in the list will be used as an index term by the KWOC program. In addition to terms on the Stop List all single character strings are omitted from indexing.

3. KWOC1 Output record format - this currently appears as follows:

Character Position

1-20	21-22	24--------104	105-125
Keyword	Space	Context	Space

Field

The output of the print program is as follows:

Character Position

1-20	21-23	24------104	105-111
Keyword	Space	Context	Space

Field

There is nc requirement for the extra space at the end of the records and no significance to the different lengths.

4. Program-assigned prefix for accession numbers - So that the library accession numbers will all fall together and come first in the sort sequence, the program prefixes them with a special "character". This "character", hexadecimal 00, is lower in the

EBCDIC collating sequence then blank (hexadecimal 40) or the first printable character, the ¢ sign, hexadecimal 4A.

5. Prefix Change for Corporate Source entries - An initial colon is replaced with an equal sign under program control so the report numbers and Clearinghouse/DDC numbers will be sorted together.

6. Sort Procedure (Job Control Language Statements) - The output records from KWOC1 are sorted by the sort-merge utilities in a single alphabetic disk sort on the first 40 characters. Six work areas are used. The output from the sort step consists of a set of ordered records that can be output on magnetic tape for retention or stored temporarily on disk and used as input to the print programs. Because of the special alpha "tags" for the various data elements, each set of related records is sorted together even though only one sort is used.

7. Basic Print Procedure (Job Control Language Statements) - The basic print procedure uses the "tape to print" utility. It reads records from the sorted output and prints them, single spaced, on the line printer. It is useful for checking over the coded input for the updating cycle. It performs no character manipulation. It skips to a new page only on a print overflow condition.

8. KWOC2, a More Sophisticated Print Program - This program contains several special printing features which are used to improve the readability of the output. These features are:

a. Page change - page changes occur on print overflow and on changes in initial character, when the initial character is one of the special character prefixes. No carriage control characters are used in the process.

b. Prefix deletion - blank is substituted for all initial special characters in the output records. This is done only for special characters below A in the collating sequence. The substitution is performed just prior to printing.

c. Section deletion - complete segments of the output may be omitted from the printing by user request. The KWOC2 input parameter card provides a space to list prefix characters. No output record containing the prefix characters specified in that field on the parameter card will be printed. For example, putting a hyphen and a slash (the characters used as prefix for author and date) in the parameter card field will cause the author and the date listing segments to be omitted.

d. Dating of Output - the date shown on the KWOC2 input parameter card is reproduced at the beginning of each listing segment. It is emitted along with the first line after each page change caused by an initial special character change.

9. Holding of old input decks - at present all input cards are retained in an archive file. The lack of a selective retrieval program makes this necessary. In order to produce a listing of any subset of the master file (i.e., The Division 3 documents) it would be necessary to use the input cards and create a new, special master file containing only Division 3 document index records. Printing this would provide the desired output.

10. Retiring of Old KWOCs - from time to time the size of the output listing will cause excessively long running times. At this point it will be necessary to retire certain records from the master file. At present it is planned to retire old KWOC records a year at a time. The number of years' worth while being retained in the active file is not yet set but will be at least one and perhaps as high as three. For older records one will have to search year by year through earlier KWOCs.

System Limitations

1. No provision has been made in the system for master file maintenance. Records entered into the master file cannot, with present KWOC programs, be changed. This requires a high level of quality control on input. It is the primary reason for having the Library staff scan the cumulative weekly listings carefully to spot the need for corrections in input cards.

2. The system provides no capability for automatic retrieval from the master file. All retrieval is performed manually using the listings of the master file and the cumulative updates.

3. The number of cards which may be input at any one time is limited to approximately 2,000. The sort programs are currently set to use 50 contiguous disk tracks for each of six sort work areas. Assuming the average number of index records generated from each card is about 6, then 2,000 cards of input will produce about 12,000 records of 125 characters each, a total of 1,500,000 characters. The six areas of 50 tracks will hold 1,875,000 characters at the blocking factor of 50 records per block used by KWOC. The difference between the capability of the work areas and the amount specified as the limit for input is "insurance."

If necessary, the number of tracks can be increased to 75 or more with only a small JCL change.

SECTION V

KWOC ECOLOGY

There are several features of the KWOC index as implemented in the Washington Library which are vital to its continued effective operation. These are:

(1) It is guardedly responsive, providing the best quality report indexing service available to meet the requirements within the resource limitations imposed.

(2) It is very inexpensive to operate.

(3) It contains timely information.

(4) It is fully documented.

A number of hidden physio-socio-psychological threats to the current health and vigor of the system exist, however. In order to assure the continued usefulness of the KWOC index care must be exercised by all involved not to let these hidden threats surface to infect KWOC with a crippling illness. A few of the major threats to be avoided are described briefly below.

The "left-in-the-sponge" syndrome often infects KWOC makers. One can always discover some little change that could be made to correct an error that got by last month or to improve the logic flow of the program. These changes require modifying the program and, once that has been started, one can always think of a few more "nice to have" capabilities (see "go-go-itis" below) and so on ad infinitum. Programming and debugging are the most expensive parts of the KWOC development. Re-programming opens up many uncertainties,

causes extra shake-down runs and destroys the validity of the documentation. It takes courage to wait it out, but the minor problems, like the surgeon's sponge, either melt away or pass some other way into oblivion.

The "go-go-itis" virus is also contagious in the creative environment at MITRE. Programmers' pulse rates rise dramatically when they dream of all that delightful library data just sitting around in the KWOC files and what they could do with it. Hallucinations of on-line querying from desk top CRTs and instant responses pop into mind. No certain cure has been found for this yet; however, massive doses of "see what you can do with just the plain old listing" while bitter to the taste, have proven effective in many cases.

The "aching backlog" is perhaps the most insidious illness which can befall the KWOC index. It is allegedly the cause of the paralysis of the prior system, Its onset is caused by a variety of agents including: "higher" priorities; set-aside-itis and; too-many-on-today's-batch-to-do-osis. Failure to process into the KWOC index each day the information about the reports that arrive each day can cause a growing numbness of the system. Existence of any backlog means that the most recently acquired reports are not included in the listings. It is often these most recent which are the most useful to the staff. It is easy to maintain throughput in the system by injecting transfusions of extra help when it is required.

The last item which must be mentioned is "documentation aphasia." With the publication of this document all users of the KWOC index have one central place to look for information about its use. Despite the warnings, imprecations and bald threats from the system developers (who we will soon discover were not as omniscient as we had thought) some changes to the KWOC system will eventually be made. Some of these will be made to adjust to new requirements or new resource situations, others will just be because "we prefer to do it that way - and it doesn't make any difference does it?." Whatever the reason for the change, it must be documented. If changes are not documented sudden heart failure may result some day when the whole system shuts down because the person who was keeping track of all the changes stays home ill or is otherwise unavailable. A well placed innoculation with a recording needle is the remedy for the problem. All who change anything about the system or any of its procedures must have the remedy applied promptly. Thus infused with the desire to record their change, they will send their information to:

Miss Paula Strain

MITRE Washington Library

ERIC User Please Note,

Appendix I Is not reproduced here.

Appendix I included in the original document consisted of a section on Indexing from the copyrighted publication Textbook on Mechanized Information Retrieval by Allen Kent, N.Y., Interscience Publishers, 1962, pp. 84-90.

ERIC/CLIS

APPENDIX II

REFERENCE DATA FOR CODING KWOC INPUT

Accession Number

- The first notation made on each input card, starting in card column 1, will be the report accession number.

- A card sequence letter will be suffixed to the accession number on all cards after the first card. These will start with A and, on succeeding cards letters B, C, D, etc. will be used as required. No letter beyond Q in the alphabet will be used for card sequencing.

- In accessioning MITRE-generated documents or others which have volumes, series, revisions, etc. in the accession number, use the following abbreviations (without punctuation):

V ... Volume

S ... Series

R ... Revision

SP ... Supplement

X ... Correction

An example: WP1234V1S2R1SP3X2

WP1234V1S2R1SP3X2A

B

.

.

.

- The Technical Reports Section of the Library and Document Control Department will assign different numbers to the different volumes or supplements of a report from another agency than MITRE (i.e., one accession number to each volume or part). MITRE-generated documents will continue to use their own report number as an accessions number in the Library. In cases where the number runs beyond 19 characters or there is other difficulty, the Technical Reports Staff will consult Miss Strain so that a consistent policy for the Library can be developed.

- The Technical Reports Section will use the control numbers assigned by Document Control Department for classified documents rather than reaccessioning them with a new number. The acronym for the issuing agency, which Document Control uses as the first part of the control number will, in the Library entry, be filed after the control number, rather than before, for a more meaningful sort by the computer.

- Classified reports will show the classification symbol in parentheses, as part of the accession number character string after the card sequence letter.

Examples:

W1234/RAC(C)

WP1279(S)

Title

- The report title will be coded immediately after the accession number character string, starting on the first card.

- Code just as in document, with minimal modifications.

- If a word in the title is also assigned as an index term, the word in the title is coded with an asterisk following it.

Example:

A STUDY OF URBANIZATION* IN THE UNITED-STATES, PART-II

URBANIZATION* is an index term as well as a title keyword.

UNITED-STATES is hyphenated to prevent generation of separate listings for both words.

PART 2 is coded as PART- 2 to prevent separate listings of "PART" and " 2."

- Terms in the title within quotation marks or inside parentheses will be coded with the left-most quotation mark or parenthesis omitted in order to avoid listing under (in the sort sequence.

Example:

GROWTH OF URBANIZATION (URBGRO) IN "DISNEYLAND EAST"

would be coded:

GROWTH OF URBANIZATION URBGRO) IN DISNEYLAND EAST"

- Normally, terms in titles will not be abbreviated. Where abbreviation is desired, only abbreviations from the Library Clerk's list of acceptable abbreviations will be used. This list is kept in her KWOC notebook.

Author

- Each author's name is coded, with a dash preceding the first letter of the last name. Initials only follow the last name. No given names are spelled out. They are connected to the last name by periods so that the character-string is treated as a single group. Junior or III are added to the name entry after the last name and before the initials, only for authors of MITRE Papers. No titles are coded.

Example:

-HENDERSON.D.D. -MAISH.A.M. -MORAN.C.V.-PETTIBONE.JR.R.O.

If the document lists a single author with ET AL rather than a number of names, ETAL is used.

Example:

-FLURY.W.R.ETAL

A group author like SASM SUPPORT GROUP is coded as a single group with hyphens as connectors.

Example:

-SASM-SUPPORT-GROUP

Index Terms

- Index terms are coded with an asterisk directly following the last letter.

COMPUTERS* PROGRAMMING*

COMPUTER-PROGRAMMING*

PROGRAMMING-LANGUAGES*

Date

- Coded as last two digits of year, month number, and day, preceded by a slash /

(YYMMDD)

30 December 1969 is /691230

(with no blanks between characters)

MITRE Department

- Indicate Department by .D or .C followed by hyphen followed by Department number in two digits.

.D-02

.D-24

.C-70

MITRE Project Number

- Project/Task number preceded by percent sign

%31.5.0

- DCA Program Line Item (PLI) numbers are appended to the Task number by a slash /

%31.5.0/20601.1234A

AD Number, also
NASA and CFSTI Numbers

- Preceded by = sign. No embedded blanks or commas

=AD896543 =N70-14321 =PB170246

Corporate Report Number

- Preceded by colon: No embedded blanks or commas

:JWGA-100-54

Corporate Source

- Preceded by * linked by - if required

  *RAND

  *ARMY-AUTOMOTIVE-COMMAND

- Abbreviations are being used for certain corporate sources whose reports make up a large number of entries in the collection. The complete list of corporate source conventions is maintained by the Library Aide in her KWOC notebook.

APPENDIX III

RUN PROCEDURES

Monthly Run Procedure (May be run less frequently)

- On Thursday afternoon take the most recent week's input cards just returned from keypunch and submit them to the Computer Center as a job with the CHECKOUT procedure. (This is the same as the weekly run procedure but is run with only one week's input.) See Figure III-1 for deck setup.

- Friday morning: get the CHECKOUT output listing. Make the corrections to the cards, and then put them in the deck with all the other cards from the past three weeks. This has to be done by 5:00 p.m. Friday because computer time is allotted for the run on Sunday night. Do not add any new cards after finding the ones that need correction. Any late keypunching must await the next week's run.

- Submit the data cards with the appropriate control cards for the multistep job CUMULIST, JOB 1 of 2. (See Figure III-2.) You have to specify on the Job Request Card that output must be suitable for reproduction.

The entries in columns 21-26 will cause suppression of any of the portions of the listing related to contract number, Department, Corporate Source, Date, Project, Corporate Report No. and AD No. Only the basic bibliographic entry, the author listing, and the subject index will be printed.

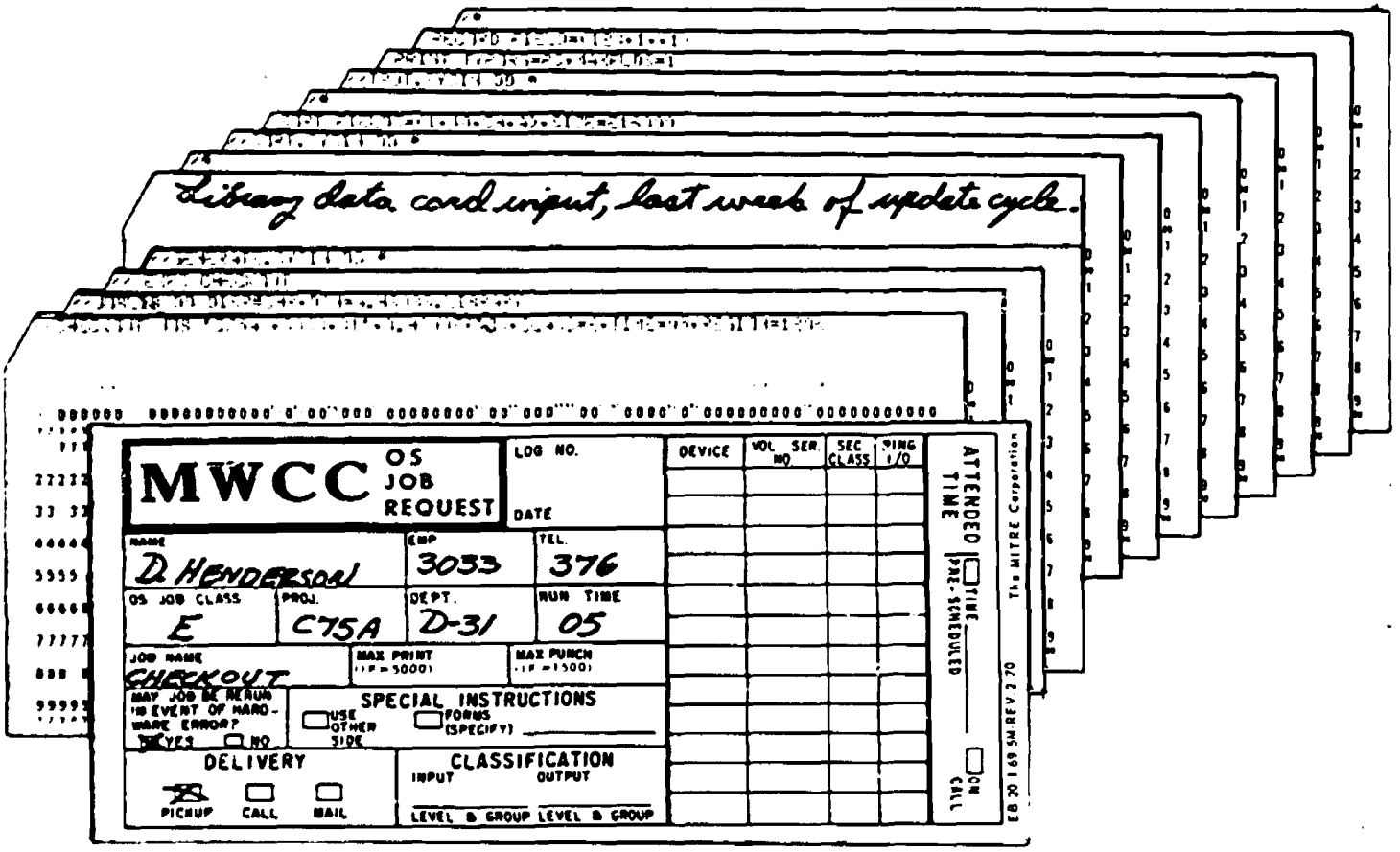


FIGURE III-1
CHECKOUT PROCEDURE INPUT

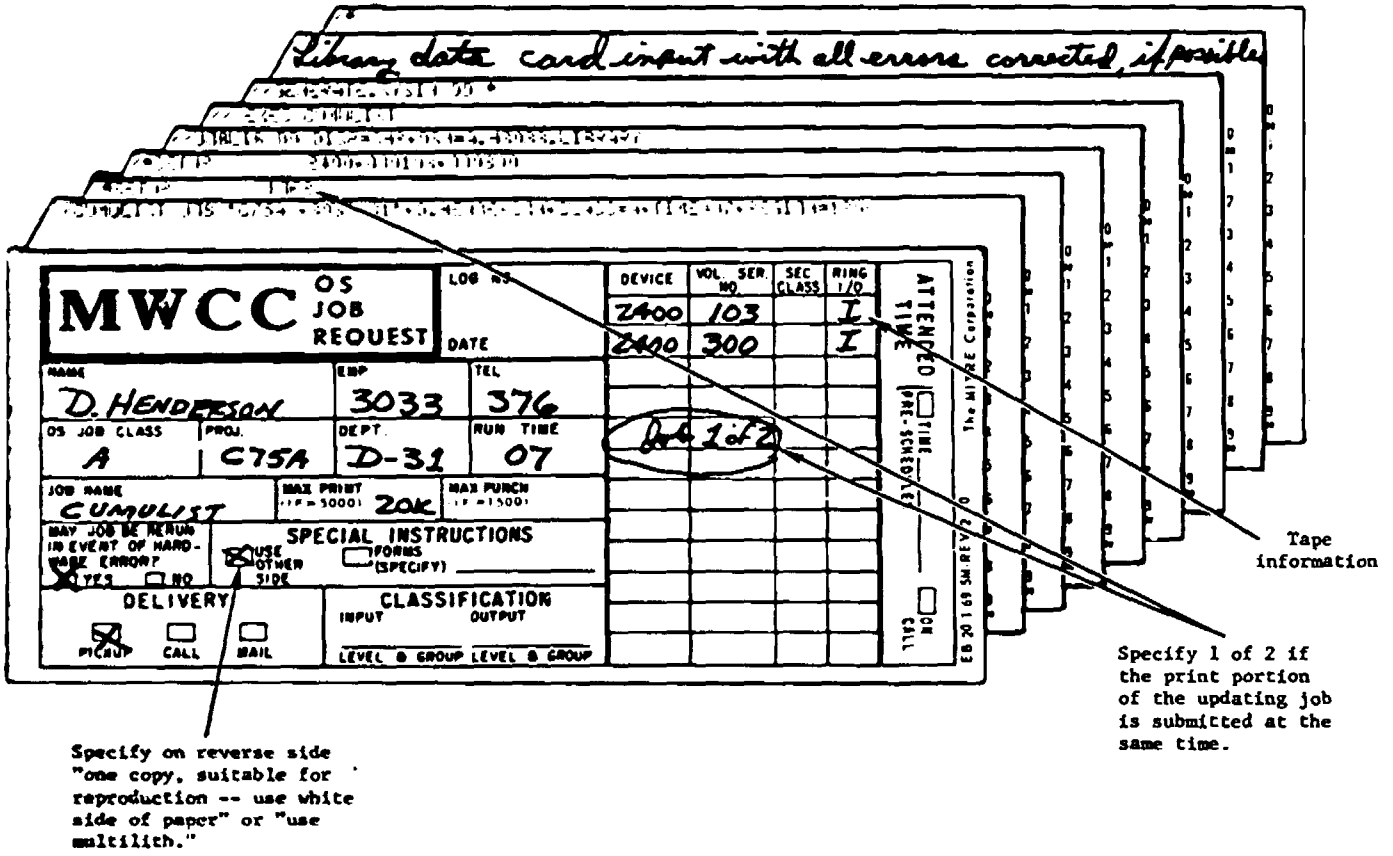


FIGURE III-2
CUMULIST PROCEDURE

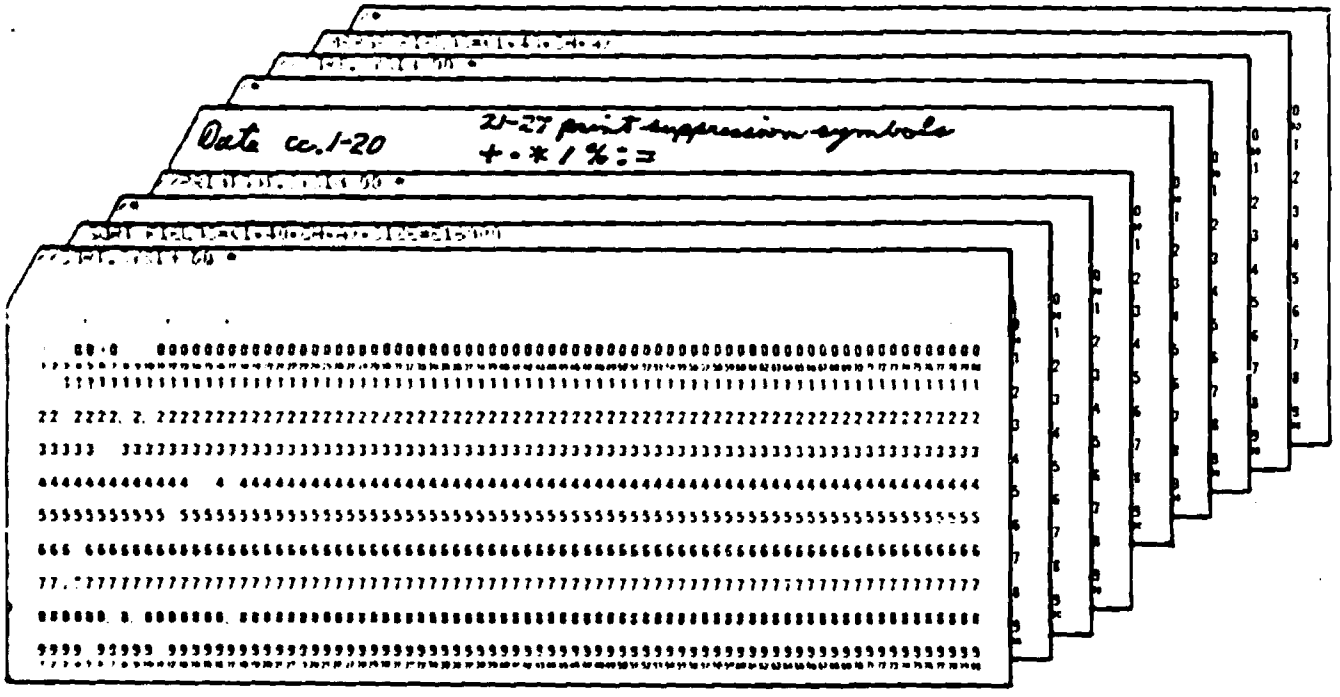


FIGURE III-2 (CONT'D)
CUMULIST PROCEDURE

The "suppress" control card for the print program in this run is keypunched as follows:

Columns 1-20, date desired on printout; e.g., 31 March 1971

Column 21 +

Column 22 .

Column 23 *

Column 24 /

Column 25 %

Column 26 :

Column 27 =

Be sure to specify on the Job Request that the printing is to be reproduced. If more than one copy is desired, specify "Repeat Print." This output is the monthly Accessions List.

- For JOB 2, PRINT, which is run immediately behind JOB 1, the control card contains the usual information and the extra notations "To be printed on striped paper" and "Repeat Print 3 copies." The output of this run is the KWOC listing which is put out for users in the Library. See Figure III-3 for input deck setup. The control card for JOB 2 is keypunched as follows:

Columns 1-20 contain the date desired on printout

Column 21 +

All other columns are left blank. The + in column 21 will cause the contract number portion of the listing to be suppressed. (Column 21 is the only column currently used.)

Weekly Run Procedure

- Monday through Thursday: code input data for all the accessions in one week; get the data keypunched, a few sheets at a time, so it is done by Thursday afternoon. Also, correct previous week's data cards on Monday.

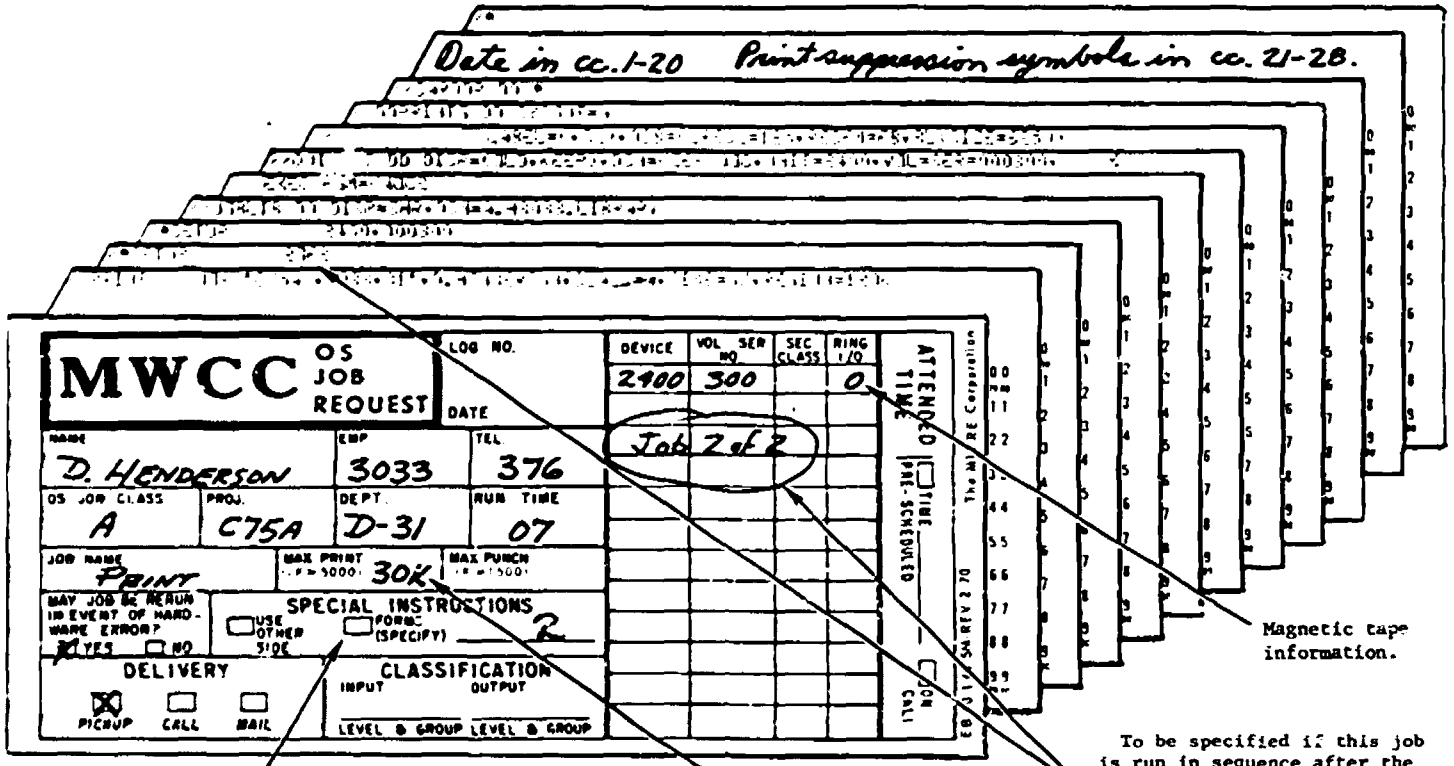


FIGURE III-3
PRINT JOB INPUT

- Monday: have the cards sorted alphabetically on columns 7-1 so that the corrections can be made easily.

- Friday afternoon: submitthe computer job, with request card and control cards for the procedure called WEEKLY; computer time is reserved for Sunday night/Monday morning (See Figure III-4 for the job deck setup). The "suppress" control card is keypunched as follows:

Columns 1-20, Date (enter in numeric form or with months spelled out).

Column 21, = sign to suppress printing of contract number listing.

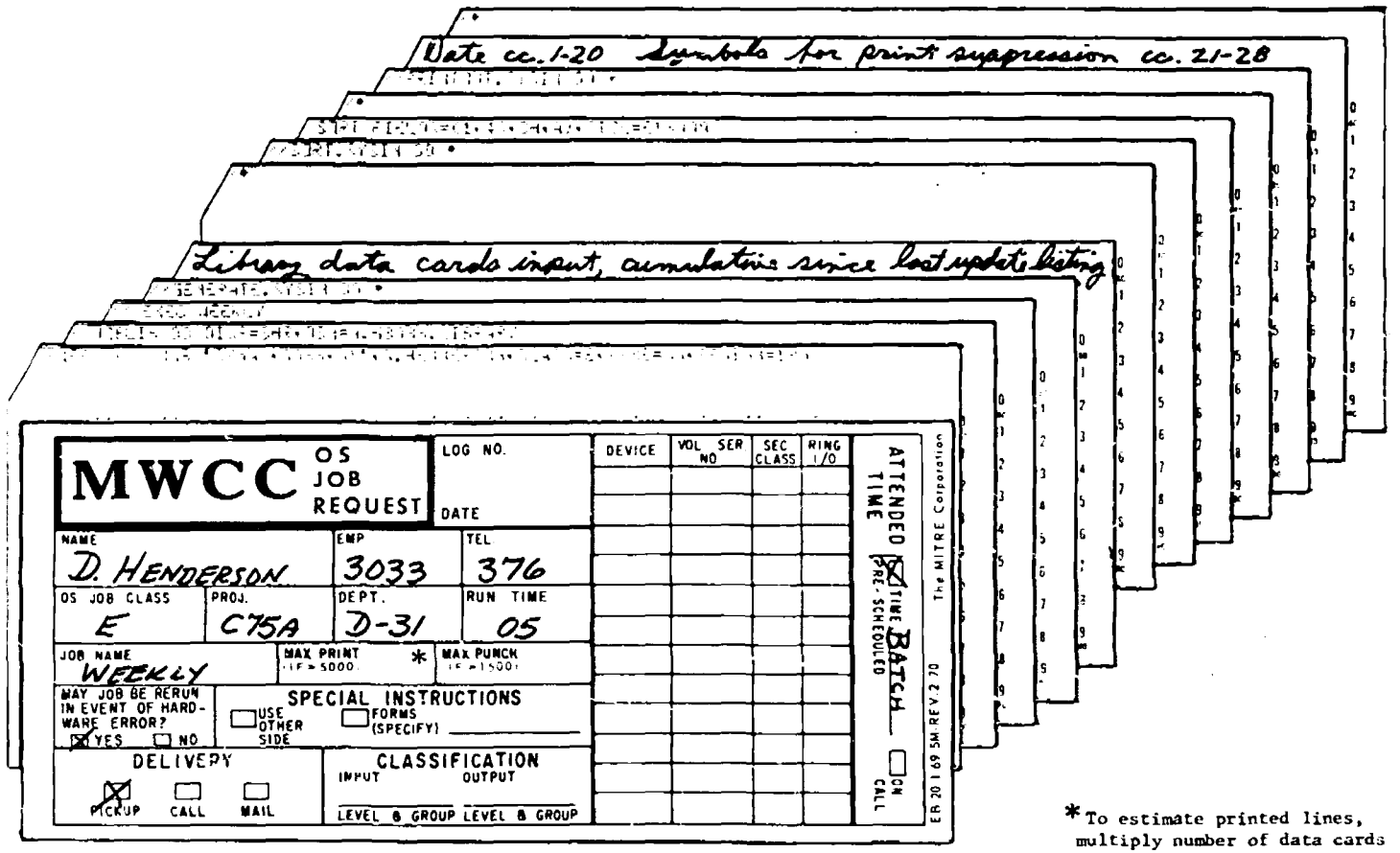
Columns 22-28, other characters that designate parts of the listing you want to suppress (Examples: colon to suppress corporate report number, period to suppress department number).

- Monday morning: pick up the weekly cumulative acquisition print-out listings. Check them for coding errors. Make a list of corrections.

- Put the new listings out for library use by noon Monday.

- Make keypunch corrections to cards and examine them to make sure the punches are not "off gauge." Duplicating on the keypunch sometimes introduces punching position of alignment errors into cards that were previously all right. Insert corrections into the deck and hold them for the next weekly run. The corrected cards will appear in the following week's run.

- Second and third week, add new punched cards to the back of deck after they have been sorted together, alphabetically, on columns 7 through 1. The sorting is for convenience in finding the cards that



*To estimate printed lines, multiply number of data cards by 10 and add 100. If the number is > 5000, specify the larger number.

FIGURE III-4
WEEKLY PROCEDURE INPUT

need correction. There is no program requirement for the cards to be in order. DO NOT leave Job Control cards in the data card deck when the deck is sorted.

APPENDIX IV

PROGRAM FLOW CHARTS

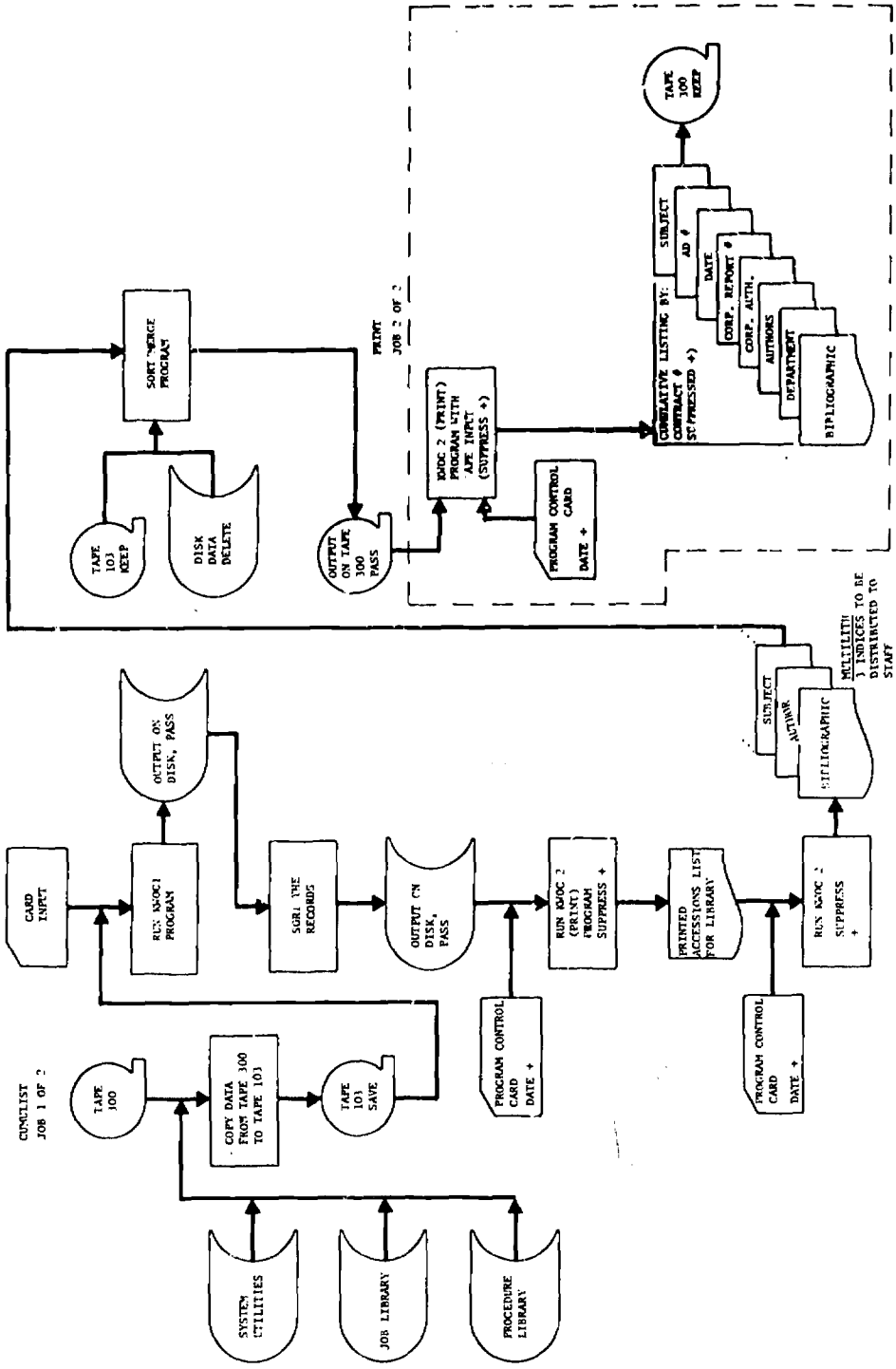


FIGURE IV-1
PROCEDURE FLOW CHART FOR CUMULIST AND PRINT JOB

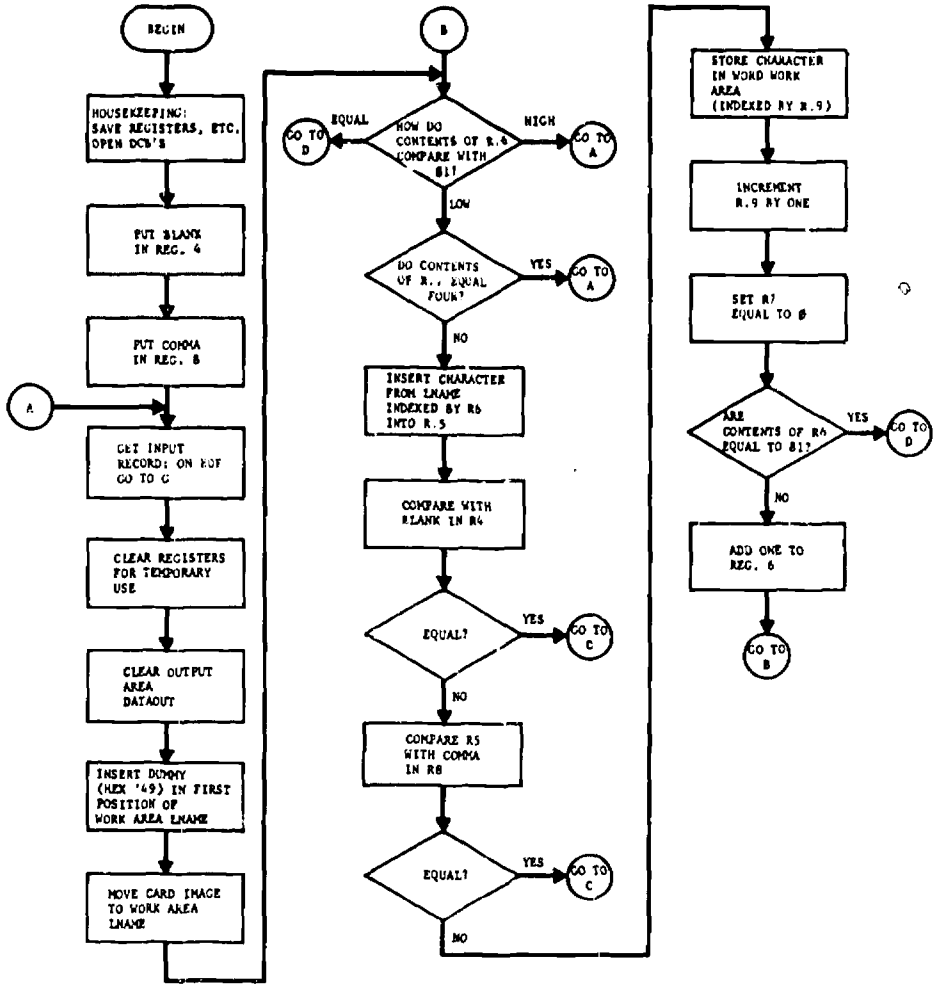


FIGURE IV-2
PROGRAM FLOW CHART FOR KWOC I

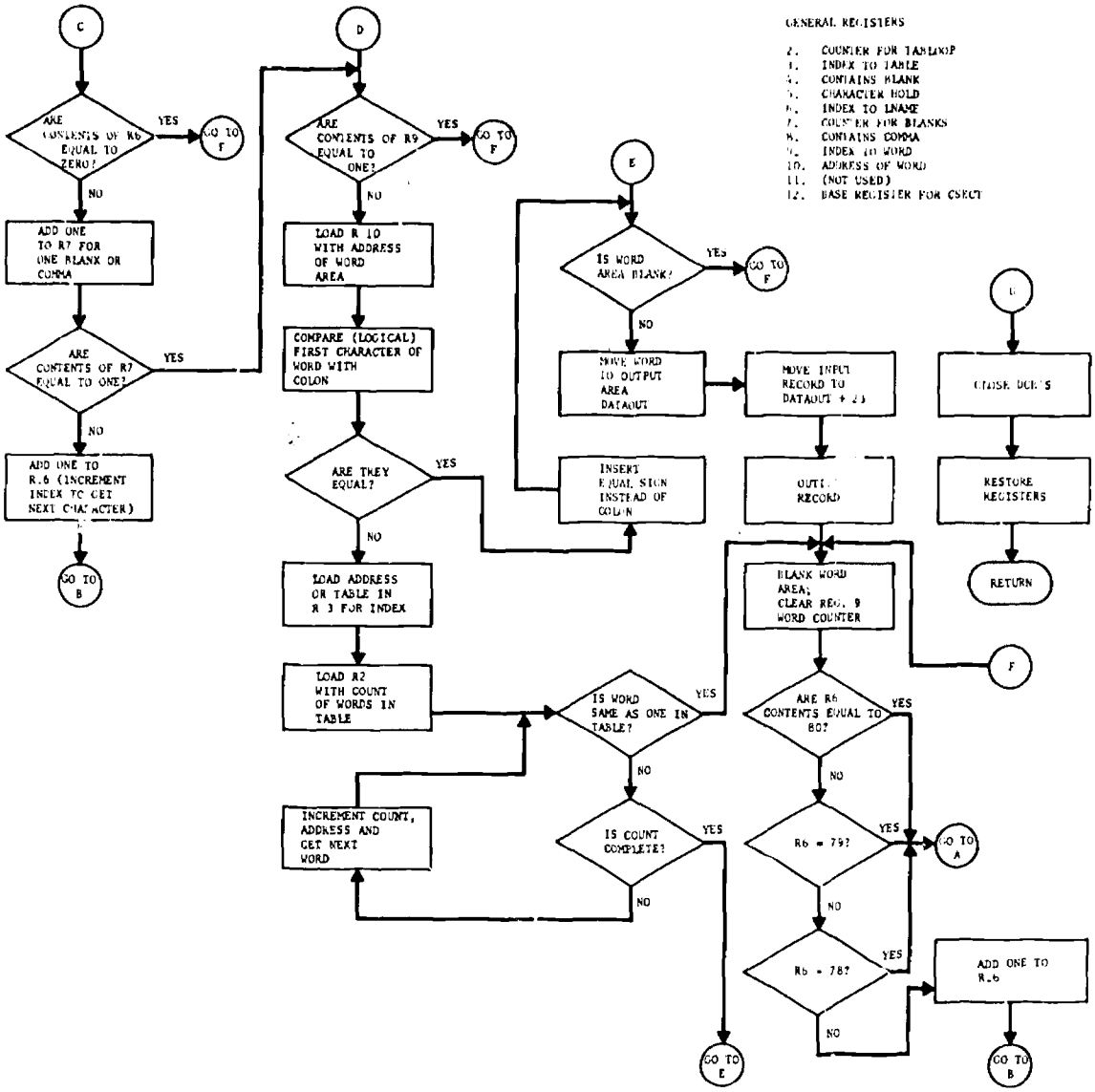


FIGURE IV-2 (CONT'D)
PROGRAM FLOW CHART FOR KWOC I

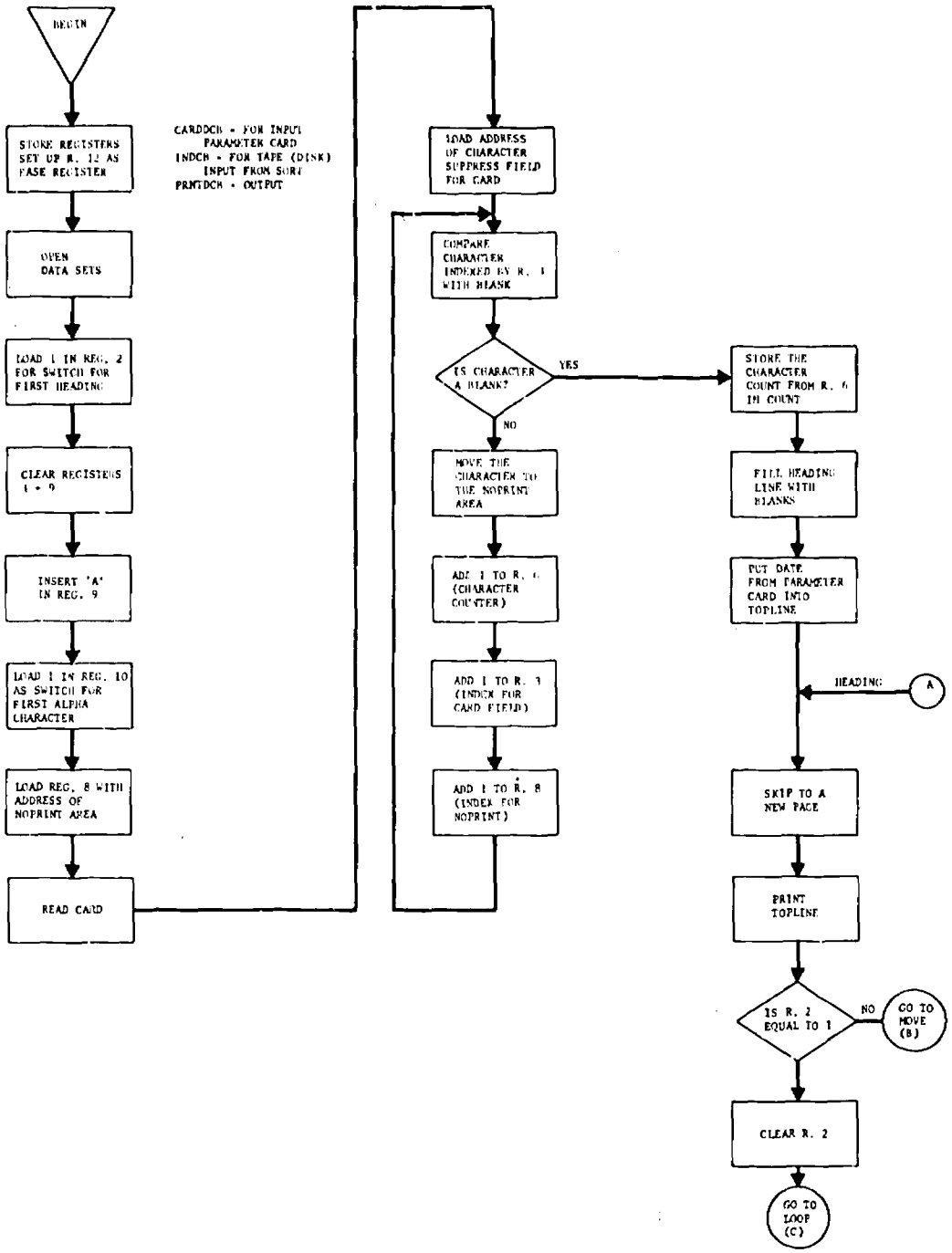


FIGURE IV-3
PROGRAM FLOW CHART FOR KWOC 2 PROGRAM

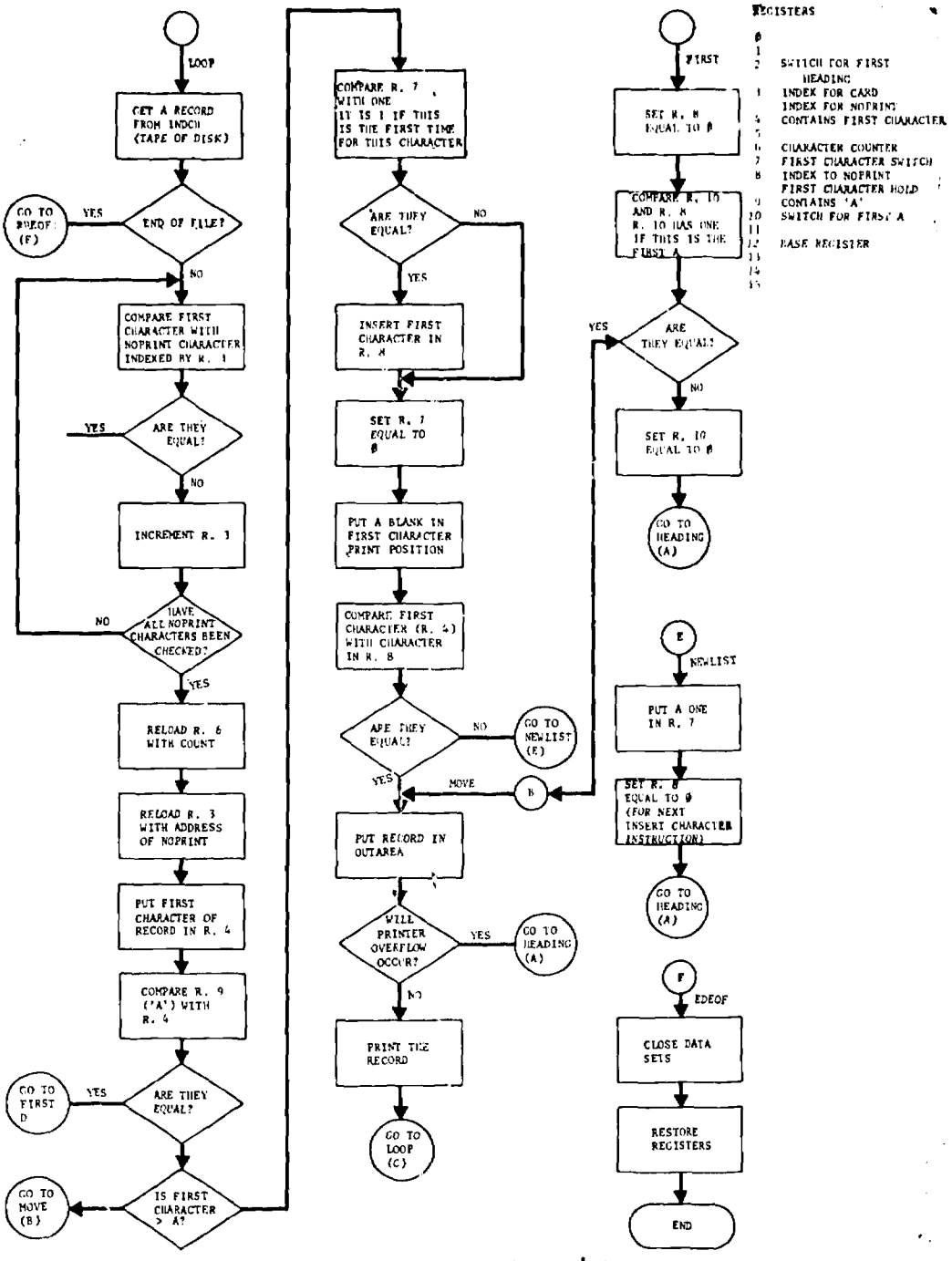


FIGURE IV-3(CONT'D)
PROGRAM FLOW CHART FOR KWOC 2 PROGRAM

APPENDIX V
PROGRAM LISTINGS

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KEYWORD CLT CF CCNTEXT (KWCC) RECURC GENERATION                                                    PAGF    2
                                                                                     (page 1 intentionally omitted)
LCC    OBJECT CODE     ACDR1 ADDR2  STMT   SOURCE STATEMENT                                     F30SEP69   6/17/70

                                       3 * THIS PROGRAM CONSIDERS AS KEYWORDS ANY AND ALL CHARACTER STRINGS     00000030
                                       4 *                      1. MORE THAN ONE CHARACTER IN LENGTH           00000040
                                       5 *                      2. NOT INCLUDED IN A TABLE (STOP LIST)         00000050
                                       6 *                      3. NOT SEPARATED FROM OTHER STRINGS BY COMMA   00000060
                                       7 *                      OR BLANK.                                      00000070
                                       8 * WHEN THE PROGRAM IS MODIFIED TO ADD WORDS THAT ARE TO BE ELIMINATED  00000080
                                       9 * FROM THE TABLE OF NON-KEY-WORDS, THE VALUE OF 'COUNT' MUST BE CHANGED 00000090
                                      10 * TO THE NEW NUMBER OF WORDS IN THE LIST AND THE PROGRAM MUST BE       00000100
                                      11 * ASSEMBLED TO PRODUCE ANOTHER OBJECT DECK.                           00000110
                                      12 *                                                                     00000120
                                      13 *                                                                     00000130
CC0000                                14            CSECT                                                    00000140
                                      15 BEGIN    SAVE  (14,12)                                                00000150
CCC000                                16+BEGIN    DS    0H
0CCCC0 90EC D00C             0000C    17+         STM   14,12,12(13) SAVE REGISTERS
CCCCC4 05C0                           18          BALR  12,0                                                00000160
CCC0C6                                19          USING *,12                                                00000170
CCC0C6 50D0 C15E             00164    20          ST    13,SAVEAREA+4                                       00000180
CCCCCA 41D0 C15A             0C160    21          LA    13,SAVEAREA                                         00000190
                                      22          PRINT NOGEN                                               00000200
                                      23          OPEN  (INDCB,,OUTDCB,(OUTPUT))                            00000210
CCCC1C 1844                           31          SR    4,4                                                 00000220
000020 1888                           32          SR    8,8                                                 00000230
C0C022 4340 C2CA             002D0    33          IC    4,BLANK                                             00000240
CCCC26 4380 C3FE             CC4C4    34          IC    8,=C','                                             00000250
                                      35 *                                                                  00000260
                                      36 MAINLINE GET   INDCB,CARD                GET A RECORD              00000270
C00028 1855                           41          SR    5,5              ******CLEAR REGISTERS******           00000280
0CC03A 1866                           42          SR    6,6                                                 00000290
CCCC3C 1877                           43          SR    7,7                                                 00000300
CCCC3E 1899                           44          SR    9,9                                                 00000310
                                      45 *                                                                  00000320
CCCC4C D200 C1A2 C2CA 0C1A8 002D0     46 CLEAR    MVC   DATAOUT(1),BLANK           CLEAR OUTPUT AREA        00000330
CCC046 D27A C1A3 C1A2 0C1A9 CC1A8     47          MVC   DATAOUT+1(123),DATAOUT                              00000340
00004C D213 C2E4 C2C0 002EA 002C6     48          MVC   WORD,BLWORD               BLANK OUT THE WORD AREA   00000350
                                      49 *                                                                  00000360
000052 D24F C270 C21F 0C276 CC225     50 MOVNAM   MVC   LNAME+1(80),CARD            MOVE CARD IMAGE         00000370
000058 D200 C26F C2CE 00275 002D4     51          MVC   LNAME(1),DUMMY     INSERTS DUMMY IN FIRST POSITION  00000380
CCC05E 4960 C2CC             002C6    52 LOOP     CH    6,ENDNAM                                            00000390
0C0062 4780 C0E2             0CC88    53          BE    ON                                                  00000391
CCC066 4720 C024             0002A    54          BH    MAINLINE                                            00000400
CCCC6A 4570 C2C4             CC2CA    55          CH    7,FOUR                    COMPARE FOR  4 BLANKS     00000410
00006E 4780 C024             0002A    56          BE    MAINLINE                                            00000420
CCCC72 4356 C26F             00275    57          IC    5,LNAME(6)                                          00000430
0CC076 1554                           58          CLR   5,4                       COMPARE CHAR TO BLANK     00000440
0CC078 4780 C096             0009C    59          BE    MOVWRD                                              00000450
CCCC7C 1558                           60          CLR   5,8              COMPARE CHARACTER TO COMMA         00000460
C0CC7E 4760 CC96             0C09C    61          BE    MOVWRD                                              00000470
CCCC82 4259 C2E4             002EA    62 STOR     STC   5,WORD(9)                                           00000480
CCCC86 4A90 C2C8             002CE    63          AH    9,ONE                                               00000490
00008A 1877                           64          SR    7,7                                                 00000500
CCCC8C 4960 C2C0             002C6    65          CH    6,ENDNAM                  COMPARE FOR END OF  RECORD 00000510
CCCC9C 4780 C0B2             CC0B8    66          BE    ON                                                  00000520
000094 4A6C C2C8             CC2CE    67 SKPSLB   AH    6,ONE                     ADD 1 TO CHAR COUNT       00000530
CCC098 47F0 CC58             0005E    68          B     LOOP                                                00000540
```

FIGURE V-I
KWOC-I PROGRAM LISTING

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  LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F30SEP69  6/17/70
                                     69 *                                                                00000550
                                     70 *                                                                00000560
000C5C 4960 C2C6            002CC    71 MOVWRD   CH    6,ZERO                                          00000570
000CAC 4780 CC24            0002A    72          BE    MAINLINE                                        00000580
000CB4 4A70 C2C8            002CE    73          AH    7,ONE                                           00000590
000CA8 4570 C2C8            002CE    74          CH    7,ONE                                           00000600
000CAC 4780 C0B2            00088    75          BE    ON                                              00000610
000CB0 4A60 C2C8            002CE    76          AH    6,ONE                                           00000620
000CB4 47F0 C05E            0005E    77          B     LOOP                                            00000630
000CB8 4990 C2C8            002CE    78 ON       CH    9,ONE                  IS WORD A SINGLE CHARACTER 00000640
000CBC 4780 C110            00116    79          BE    CLRWORD                                         00000650
000CC0 41A0 C2E4            002EA    80          LA    10,WORD                                         00000651
0000C4 0500 A000 C2CC CCC00 002D2    81          CLC   0(1,10),COLON    IS FIRST CHARACTER A COLON?  00000652
000CCA 4770 C0D2            000D8    82          BNE   LOADTAB                                         00000653
0000CE D200 ACCC C2CD 0CCCC 002D3    83          MVC   0(1,10),EQUALS       SUBSTITUTE = FOR :       00000654
0000D4 47F0 C0EC            000F2    84          B     STORLAST       SKIP TABLE - NOT ON LIST        00000655
000CD8 4130 C4C6            0040C    85 LOADTAB  LA    3,TABLE         LOAD ADDRESS TO CHECK STOP-LIST 00000660
000CDC 5820 C402            0C408    86          L     2,COUNT                                         00000670
000CE0 D513 3000 C2E4 00000 002EA    87 TABLOOP  CLC   0(20,3),WORD                                    00000680
000CE6 4780 C110            00116    88          BE    CLRWORD                                         00000690
000CEA 4133 0014            00014    89          LA    3,20(3)                INCREMENT ADDRESS        00000700
000CEE 4620 C0DA            000E0    90          BCT   2,TABLOOP              BRANCH OUT IF ALL WORDS CHECKED 00000710
000CF2 0513 C2E4 C2DC 0C2EA 002D6    91 STORLAST CLC   WORD(20),BLWORD                                  00000720
0000F8 4780 C110            00116    92          BE    CLRWORD                                         00000721
000CFC D213 C1A2 C2E4 001A8 002EA    93          MVC   DATAOUT(20),WORD          MOVES KEY WORD TO O/P AREA 00000722
000102 D250 C1B8 C2EF 0C1BF 0C275    94          MVC   DATAOUT+23(81),LNAME                              00000730
                                     95          PUT   OUTDCB,DATAOUT                                    00000740
000116 D213 C2E4 C2D0 002EA 002D6   100 CLRWORD  MVC   WORD,BLWORD             BLANK WORD AREA          00000750
000110 1899                         101          SR    9,9                                             00000760
000116 4960 C2C2            002C8   102          CH     6,NEARLY                                       00000770
000122 4780 CC24            0002A   103          BE    MAINLINE       GET NEW RECORD IF ONLY ONE OR TWO 00000780
000126 4960 C3FA            00400   104          CH    6,=H'79'       CHARACTERS OR BLANKS REMAIN      00000790
00012A 4780 C024            0002A   105          BE    MAINLINE                                        00000800
00012E 4560 C3FC            0C4C2   106          CH    6,=H'78'                                        00000810
000132 4780 C024            0C02A   107          BE    MAINLINE                                        00000820
000136 4A60 C2C8            002CE   108 ADDBR    AH    6,ONE                                           00000830
00013A 47F0 CC58            C005E   109          B     LOOP                                            00000840
                                    110 *                                                              00000850
                                    111 *                                                              00000860
                                    112 RDEOF    CLOSE (INDCB)                                         00000870
                                    118          CLOSE (OUTDCB)                                        00000880
000156 58D0 C15E            00164   124          L     13,SAVEAREA+4                                   00000890
                                    125          RETURN (14,12)                                        00000900
                                    128 *                                                              00000910
                                    129 *        CONSTANTS USED ABOVE                                  00000920
000160                              130 SAVEAREA DS    18F                                             00000930
0001A8                              131          DS    0H                                              00000940
0001A8                              132 DATAOUT  DS    CL125                  OUTPUT AREA              00000950
000225                              133 CARD     DS    CL80                                            00000960
000275                              134 LNAME    DS    CL81                                            00000970
0002C6 0051                         135 ENDNAM   DC    XL2'51'                                         00000980
0002C8 0050                         136 NEARLY   DC    XL2'50'                                         00000990
0002CA 0004                         137 FOUR     DC    XL2'4'                                          00001000
0002CC C000                         138 ZERO     DC    XL2'0'                 FOR ZEROING              00001010
0002CE 0001                         139 ONE      DC    XL2'1'                                          00001020
```

FIGURE V-I (CONTINUED)
KWOC-I PROGRAM LISTING

LOC	OBJECT CODE	ADDR1 ADDR2	STMT	SOURCE STATEMENT			F30SFP69 6/17/70
CCC2DO	4040		140	BLANK CC CL2' '			00001030
CCC2D2	7A		141	CCLCN CC CL1':'			00001031
0002C3	7E		142	EQUALS DC CL1'='			00001032
CCC2D4	C049		143	DUMMY CC XL2'00'	DUMMY HAS TO BE A NON-PRINTABLE,		00001040
			144	*	NON-BLANK CHARACTER LOWER IN THE		00001041
			145	*	COLLATING SEQUENCE THAN ANY ALPHA		00001042
			146	*	CHARACTER		00001043
0002D6	40404C4040404C4040		147	BLWORD DC CL20' '	BLANK WORD AREA		00001050
CCC2EA	4040404040404040		148	WORD DC CL20' '	WORD HOLD		00001060
CCC2FE	40404C4C4C4C4C4C		149	SPACE CC CL80' '	FOR WORDS LONGER THAN 20 CHARACTERS		00001070
			150	*	TO PREVENT CLOBBERING TABLE COUNT		00001080
			151	*			00001090
			152	*	DCB DEFINITIONS		00001100
			153	*			00001110
			154	INDCB DCB	BLKSIZE=80,DDNAME=SARDDD,DEVD=RD,DSORG=PS,EODAD=RDEOF,		X00001120
					LRECL=80,MACRF=(GM),RECFM=FB		00001130
			210	*			00001140
			211	OUTDCB DCB	BFALN=F,BFTEK=S,DDNAME=QUICOUT,DEVD=DA,		X00001150
					LRECL=125,BLKSIZE=6250,		X00001160
					DSORG=PS,EROPT=SKP,MACRF=(PM),RECFM=FB		00001170
CCC4C0			267	LTORG			00001180
CCC4C0	004F		268	=H'79'			
0004C2	004E		269	=H'78'			
CCC4C4	6B		270	=C','			
CCC4C5	CCCCOC						
CCC4C8	00C001BE		271	COUNT CC F'398'			00001190
			272	* 'COUNT' GIVES NUMBER OF WORDS IN 'TABLE'. ITS VALUE MUST BE			00001200
			273	* CHANGED WHEN WORDS ARE ADDED OR DELETED.			00001210
CCC4DC	C1C2D3C5404C4040		274	TABLE DC CL20'ABLE '			00001220
CCC4E0	C1C2D4E4E34C4C4C		275	DC CL20'ABOUT '			00001230
0004F4	C1C2D485C54C404C		276	DC CL20'ABOVE '			00001240
CCC508	C1C3C3D4D4C7C1C5		277	DC CL20'ACCOMPANY '			00001250
CCC51C	C1C3C3D4D5C44040		278	DC CL20'ACCORD '			00001260
000470	C1C3D9C8E2E24040		279	DC CL20'ACROSS '			00001270
CCC484	C1C3E3E4C1D34040		280	DC CL20'ACTUAL '			00001280
CCC498	C1C4C4404C4C4040		281	DC CL20'ADD '			00001290
CCC4AC	C1C4C6C3C3E34040		282	DC CL20'AFFECT '			00001300
CCC4C0	C1C6E3C5D5C6C4C4		283	DC CL20'AFTER '			00001310
0004E4	C1C6E3C5D5E4C1D5		284	DC CL20'AFTERWARD '			00001320
CCC4F8	C1C7C1C9C5404040		285	DC CL20'AGAIN '			00001330
CCC50C	C1C7C3C5D5E2E340		286	DC CL20'AGAINST '			00001340
000510	C1C7D4C4C4C4C4C4		287	DC CL20'AGO '			00001350
CCC524	C1D3D3C4C4C4C4C4		288	DC CL20'ALL '			00001360
CCC538	C1D3D3D6E4C5C44C		289	DC CL20'ALLOWED '			00001370
CCC54C	C1D3D3D6E4C9C5C7		290	DC CL20'ALLOWING '			00001380
CCC560	C1D3D3D6[illegible]		291	DC CL20'ALLOWS '			00001390
CCC574	C1D3D4D4E2E24040		292	DC CL20'ALMOST '			00001400
CCC588	C1D3D6D5C5404040		293	DC CL20'ALONE '			00001410
CCC59C	C1D3D4D5C74C4C40		294	DC CL20'ALONG '			00001420
CCC5B0	C1D3D4C5C1C4E84C		295	DC CL20'ALREADY '			00001430
CCC5C4	C1D3E2D4D4C4C4C4		296	DC CL20'ALSO '			00001440
CCC5D8	C1D3E3C8D4E4C7C8		297	DC CL20'ALTHOUGH '			00001450
CCC5EC	C1D3E6C1E8E24040		298	DC CL20'ALWAYS '			00001460
CCC600	C1D4C4C4C4C4C4C4		299	DC CL20'AM '			00001470
CCC614	C1D4D4D5C74C4C4C		300	DC CL20'AMONG '			00001480

FIGURE V-I (CONTINUED)
KWOC-I PROGRAM LISTING

LOC	OBJECT CODE	ADDR1 ADDR2	STMT	SOURCE STATEMENT		F30SEP69 6/17/70
000628	C1D5404040404040		301	DC	CL20'AN	00001490
00063C	C1D5C44040404040		302	DC	CL20'AND	00001500
000650	C1D5D6E3C8C5D940		303	DC	CL20'ANOTHER	00001510
000664	C1D5E84040404040		304	DC	CL20'ANY	00001520
000678	C1D5E8E3C8C9D5C7		305	DC	CL20'ANYTHING	00001530
00068C	C1D7D7D3E8404040		306	DC	CL20'APPLY	00001540
0006A0	C1D7D7D3E8C9D5C7		307	DC	CL20'APPLYING	00001550
0006B4	C1D9C54040404040		308	DC	CL20'ARE	00001560
0006C8	C1D9D6E4D5C44040		309	DC	CL20'AROUND	00001570
0006DC	C1E2404040404040		310	DC	CL20'AS	00001580
0006F0	C1E2D24040404040		311	DC	CL20'ASK	00001590
000704	C1E2D2C5C4404040		312	DC	CL20'ASKED	00001600
000718	C1E2D2C9D5C74040		313	DC	CL20'ASKING	00001610
00072C	C1E2D2E240404040		314	DC	CL20'ASKS	00001620
000740	C1E6C1E840404040		315	DC	CL20'AWAY	00001630
000754	C1E3404040404040		316	DC	CL20'AT	00001640
000768	C2C1E2C5C4404040		317	DC	CL20'BASED	00001650
00077C	C2C5404040404040		318	DC	CL20'BE	00001660
000790	C2C5C3C1D4C54040		319	DC	CL20'BECAME	00001670
0007A4	C2C5C3C1E4E2C540		320	DC	CL20'BECAUSE	00001680
0007B8	C2C5C3D6D4C54040		321	DC	CL20'BECOME	00001690
0007CC	C2C5C5D540404040		322	DC	CL20'BEEN	00001700
0007E0	C2C5C6D6D9C54040		323	DC	CL20'BEFORE	00001710
0007F4	C2C5C7C1D5404040		324	DC	CL20'BEGAN	00001720
000808	C2C5C7C9D5404040		325	DC	CL20'BEGIN	00001730
00081C	C2C5C7C9D5E24040		326	DC	CL20'BEGINS	00001740
000830	C2C5C8C9D5C44040		327	DC	CL20'BEHIND	00001750
000844	C2C5C9D5C7404040		328	DC	CL20'BEING	00001760
000858	C2C5D3C9C5E5C540		329	DC	CL20'BELIEVE	00001770
00086C	C2C5D3D6E6404040		330	DC	CL20'BELOW	00001780
000880	C2C5D5C5C1E3C840		331	DC	CL20'BENEATH	00001790
000894	C2C5E2C9C4C54040		332	DC	CL20'BESIDE	00001800
0008A8	C2C5E2E340404040		333	DC	CL20'BEST	00001810
0008BC	C2C5E3E3C5D94040		334	DC	CL20'BETTER	00001820
0008D0	C2C5E3E6C5C5D540		335	DC	CL20'BETWEEN	00001830
0008E4	C2C5E8D6D5C44040		336	DC	CL20'BEYOND	00001840
0008F8	C2D6E3C840404040		337	DC	CL20'BOTH	00001850
00090C	C2D9C9D5C7404040		338	DC	CL20'BRING	00001860
000920	C2D9C9D5C7C9D5C7		339	DC	CL20'BRINGING	00001870
000934	C2D9C9D5C7E24040		340	DC	CL20'BRINGS	00001880
000948	C2D9D6E4C7C8E340		341	DC	CL20'BROUGHT	00001890
00095C	C2E4E34040404040		342	DC	CL20'BUT	00001900
000970	C2E8404040404040		343	DC	CL20'BY	00001910
000984	C3C1D4C540404040		344	DC	CL20'CAME	00001920
000998	C3C1D54040404040		345	DC	CL20'CAN	00001930
0009AC	C3C1D5D5D6E34040		346	DC	CL20'CANNOT	00001940
0009C0	C3C1E4E2C5C44040		347	DC	CL20'CAUSED	00001950
0009D4	C3C1E4E2C9D5C740		348	DC	CL20'CAUSING	00001960
0009E8	C3C5D9E3C1C9D540		349	DC	CL20'CERTAIN	00001970
0009FC	C3D3C5C1D9D3E840		350	DC	CL20'CLEARLY	00001980
000A10	C3D64B4040404040		351	DC	CL20'CO.	00001990
000A24	C3D6D4C540404040		352	DC	CL20'COME	00002000
000A38	C3D6D4C5E2404040		353	DC	CL20'COMES	00002010
000A4C	C3D6D4C9D5C74040		354	DC	CL20'COMING	00002020
000A60	C3D6D5E2C9C4C5D9		355	DC	CL20'CONSIDER	00002030

FIGURE V-1 (CONTINUED)
KWOC-1 PROGRAM LISTING

LOC	OBJECT CODE	ADDR1	ADDR2	STMT	SOURCE STATEMENT		F30SEP69 6/17/70
CCCA74	C3[illegible]4040			356	CC CL20'CORP.	•	00002040
CCCA8[illegible]	C3D8E4D3C4404040			357	CC CL20'COULD	•	00002050
CCOA9C	C4C5D7E3484C4040			358	CC CL2C'DEPT.	•	00002060
CCCAB0	C4C5E2D7C9E3C540			359	CC CL20'DESPITE	•	00002070
CCCAC4	C4C5C44C4C4C4C4C			360	CC CL20'DI	•	00002080
CCCACB	C4D6404040404C4C			361	CC CL20'DO	•	00002090
CCCAEC	C4D6C5E2C4C4C4C			362	CC CL20'DOES	•	00002100
CCCB00	C4D6C5D5C7C4C4C			363	CC CL20'DOING	•	00002110
CCCB14	C4D6D5C5404C4040			364	CC CL20'DONE	•	00002120
CCCB28	C4D6E4D5C4C4C4C			365	CC CL20'DOWN	•	00002130
CCCB3C	C4E4C5404C4C4C4C			366	CC CL20'DUE	•	00002140
CCCB50	C4E4D7C5E3C74040			367	CC CL20'DURING	•	00002150
CCCB64	C5C1C3C8404C4040			368	CC CL20'EACH	•	00002160
CCCB78	C5C1E2E4C4C4C4C			369	CC CL2C'EASY	•	00002170
CCCB8C	C5C1E2C9D3E34040			370	CC CL20'EASILY	•	00002180
CCCBA0	C5C9C7C8E34C4C4C			371	CC CL20'EIGHT	•	00002190
CCCBB4	C5C9E3C8C5C54C4C			372	CC CL20'EITHER	•	00002200
CCCBC8	C5D3E2C54C4C4040			373	CC CL20'ELSE	•	00002210
CCCBDC	C5D5C8E4C7C84C4C			374	CC CL20'ENOUGH	•	00002220
CCCBF0	C5E2D7C9C3C9C1C3			375	CC CL20'ESPECIAL	•	00002230
CCCC04	C5E3C3404C4C4040			376	CC CL20'ETC.	•	00002240
CCCC18	C5E5C5D5C4C4C4C			377	CC CL20'EVEN	•	00002250
CCCC2C	C5E5C5D5404C4040			378	CC CL20'EVER	•	00002260
CCCC40	C5E5C5D5E8C4C4C			379	CC CL20'EVERY	•	00002270
CCCC54	C5E5C5D5E8E3C9C9			380	CC CL20'EVERYTHING	•	00002280
CCCC68	C6C1D9C4C4C4C4C			381	CC CL20'FAR	•	00002290
CCCC7C	C6C1D5E3C8C5C54C			382	CC CL20'FARTHER	•	00002300
CCCC90	C6C5E4C4C4C4C4C			383	CC CL20'FEW	•	00002310
CCCCA4	C6C5E4C5C54C404C			384	CC CL20'FEWER	•	00002320
CCCCB8	C6C9D5C1D3C3E84C			385	CC CL20'FINALLY	•	00002330
CCCCCC	C6C9D5C44C4C4040			386	CC CL20'FIND	•	00002340
CCCCE0	C6C9D5C4C9E5C740			387	CC CL20'FINDING	•	00002350
CCCCF4	C6C9D5C4E2C4C4C			388	CC CL20'FINDS	•	00002360
CCCD08	C6C9E5C54C4C4040			389	CC CL2C'FIVE	•	00002370
CCCD1C	C6D6D3D3D4E84040			390	CC CL20'FOLLOW	•	00002380
CCCD30	C6D6D4C4C4C4C4C			391	CC CL20'FOR	•	00002390
CCCD44	C6D6D5E3C8C4C4C4			392	CC CL20'FORTH	•	00002400
CCCD58	C6D6D5E3C8C3C4D4			393	CC CL20'FORTHCOMING	•	00002410
CCCD6C	C6D6E4D3C44C4C4C			394	CC CL20'FOUND	•	00002420
CCCD80	C6D6E4D5C4C4C4C			395	CC CL20'FOUR	•	00002430
CCCD94	C6D7D4D44C4C4C40			396	CC CL20'FROM	•	00002440
CCCDA8	C6E5D6C5E3C4C4C4			397	CC CL20'FRONT	•	00002450
CCCDBC	C6E6D3C4C9D34040			398	CC CL20'FULFIL	•	00002460
CCCDC0	C6E6D3D3C4C4C4C			399	CC CL20'FULL	•	00002470
CCCDE4	C6E6D3D3E8C4C4C4			400	CC CL20'FULLY	•	00002480
CCCDF8	C6E6D5E3C8C5D54C			401	CC CL20'FURTHER	•	00002490
CCCE0C	C7C1E5C54C404040			402	CC CL20'GAVE	•	00002500
CCCE20	C7C5E3C4C4C4C4C			403	CC CL20'GET	•	00002510
CCCE34	C7C5E3E2C4C4C4C			404	CC CL20'GETS	•	00002520
CCCE48	C7C5E3E3C9C5C74C			405	CC CL20'GETTING	•	00002530
CCCE5C	C7C9E5C54C4C4040			406	CC CL20'GIVE	•	00002540
CCCE70	C7C9E5C5D5C4C4C			407	CC CL20'GIVEN	•	00002550
CCCE84	C7C9E5C5E2C4C4C			408	CC CL2C'GIVES	•	00002560
CCCE98	C7C9E5C5D5C74040			409	CC CL20'GIVING	•	00002570
CCCEAC	C7D6C4C4C4C4C4C			410	CC CL20'GO	•	00002580

FIGURE V-I (CONTINUED)
KWOC-I PROGRAM LISTING

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LOC    OBJECT CODE       ADDR1 ADDR2  STMT   SOURCE STATEMENT                    F305F769  6/17/70
000EC0 C7D6C5E240404040               411         DC    CL20'GOES       '            00002590
000ED4 C7D6C9D5C7404040               412         DC    CL20'GOING      '            00002600
000EE8 C7D6D5C540404040               413         DC    CL20'GONE       '            00002610
000EFC C7D6D6C440404040               414         DC    CL20'GOOD       '            00002620
000F10 C7D6E34040404040               415         DC    CL20'GOT        '            00002630
000F24 C8C1C44040404040               416         DC    CL20'HAD        '            00002640
000F38 C8C1D7D7C5D54040               417         DC    CL20'HAPPEN     '            00002650
000F4C C8C1E24040404040               418         DC    CL20'HAS        '            00002660
000F60 C8C1E5C540404040               419         DC    CL20'HAVE       '            00002670
000F74 C8C1E5C9D5C74040               420         DC    CL20'HAVING     '            00002680
000F88 C8C5404040404040               421         DC    CL20'HE         '            00002690
000F9C C8C5D94040404040               422         DC    CL20'HER        '            00002700
000FB0 C8C5D9C540404040               423         DC    CL20'HERE       '            00002710
000FC4 C8C5D9E240404040               424         DC    CL20'HERS       '            00002720
000FD8 C8C5D9E2C5D3C640               425         DC    CL20'HERSELF    '            00002730
000FEC C8C9D44040404040               426         DC    CL20'HIM        '            00002740
001000 C8C9D4E2C5D3C640               427         DC    CL20'HIMSELF    '            00002750
001014 C8C9E24040404040               428         DC    CL20'HIS        '            00002760
001028 C8D6E64040404040               429         DC    CL20'HOW        '            00002770
00103C C8D6E6C5E5C5D940               430         DC    CL20'HOWEVER    '            00002780
001050 C940404040404040               431         DC    CL20'I          '            00002790
001064 C9C6404040404040               432         DC    CL20'IF         '            00002800
001078 C9D5404040404040               433         DC    CL20'IN         '            00002810
00108C C9D5C34B40404040               434         DC    CL20'INC.       '            00002820
0010A0 C9D5C3D3E4C4C540               435         DC    CL20'INCLUDE    '            00002830
0010B4 C9D5C4C5C5C44040               436         DC    CL20'INDEED     '            00002840
0010C8 C9D5E2C9C4C54040               437         DC    CL20'INSIDE     '            00002850
0010DC C9D5E2E3C5C1C440               438         DC    CL20'INSTEAD    '            00002860
0010F0 C9D5E3D640404040               439         DC    CL20'INTO       '            00002870
001104 C9D5E5D6D3E5C540               440         DC    CL20'INVOLVE    '            00002880
001118 C9E2404040404040               441         DC    CL20'IS         '            00002890
00112C C9E3404040404040               442         DC    CL20'IT         '            00002900
001140 C9E3E24040404040               443         DC    CL20'ITS        '            00002910
001154 C9E3E2C5D3C64040               444         DC    CL20'ITSELF     '            00002920
001168 D1E4E2E340404040               445         DC    CL20'JUST       '            00002930
00117C D2C5C5D740404040               446         DC    CL20'KEEP       '            00002940
001190 D2C5C5D7C9D5C740               447         DC    CL20'KEEPING    '            00002950
0011A4 D2C5C5D7E2404040               448         DC    CL20'KEEPS      '            00002960
0011B8 D2C5D7E340404040               449         DC    CL20'KEPT       '            00002970
0011CC D2D5C5E640404040               450         DC    CL20'KNEW       '            00002980
0011E0 D2D5D6E640404040               451         DC    CL20'KNOW       '            00002990
0011F4 D2D5D6E6C9D5C740               452         DC    CL20'KNOWING    '            00003000
001208 D2D5D6E6D5404040               453         DC    CL20'KNOWN      '            00003010
00121C D2D5D6E6E2404040               454         DC    CL20'KNOWS      '            00003020
001230 D3C1D9C7C5D3E840               455         DC    CL20'LARGELY    '            00003030
001244 D3C1E2E340404040               456         DC    CL20'LAST       '            00003040
001258 D3C1E3C540404040               457         DC    CL20'LATE       '            00003050
00126C D3C1E3C5D3E84040               458         DC    CL20'LATELY     '            00003060
001280 D3C1E3C5D9404040               459         DC    CL20'LATER      '            00003070
001294 D3C5C1E2E3404040               460         DC    CL20'LEAST      '            00003080
0012A8 D3C5C1E5C5404040               461         DC    CL20'LEAVE      '            00003090
0012BC D3C5E2E240404040               462         DC    CL20'LESS       '            00003100
0012D0 D3C5E34040404040               463         DC    CL20'LET        '            00003110
0012E4 D3C5E3E240404040               464         DC    CL20'LETS       '            00003120
0012F8 D3C5E3E3C9D5C740               465         DC    CL20'LETTING    '            00003130
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FIGURE V-1 (CONTINUED)
KWOC-1 PROGRAM LISTING

LOC	OBJECT CODE	ADDR1	ADDR2	STMT	SOURCE STATEMENT		F3OSFP69 6/17/70
001300	C3C9D2C5404C4040			466	DC CL20'LIKE	•	00003140
001320	D3C9D2C5D3E84040			467	CC CL2C'LIKELY	•	00003150
001334	D3C9D2C5E24C4C4C			468	CC CL20'LIKES	•	00003160
001348	D3C9D3E3C3C54040			469	DC CL20'LITTLE	•	00003170
001360	D3D6D5C74C4C4040			470	CC CL20'LONG	•	00003180
001370	D3D6D5C7E24C4040			471	DC CL20'LONGS	•	00003190
001384	D3D6D6D24040404C			472	DC CL20'LOOK	•	00003200
001398	D3D6D6D2C5D5C74C			473	DC CL20'LOOKING	•	00003210
0013AC	D3D6E4404040C4C4			474	DC CL20'LON	•	00003220
0013C0	D3E3C4E4C4C4C040			475	DC CL20'LTC.	•	00003230
0013D4	D4C1C4C54C4C4040			476	DC CL20'MACE	•	00003240
0013E8	D4C1D2C540404040			477	DC CL20'MARF	•	00003250
0013FC	D4C1D2C5E24C4040			478	DC CL20'MARES	•	00003260
001410	D4C1D2C4D5C74C4C			479	DC CL20'MARING	•	00003270
001424	D4C1D5E4D4D4D4D4			480	DC CL2C'MANY	•	00003280
001438	D4C1E4C4C4C4C040			481	CC CL20'MAY	•	00003290
00144C	D4C54C4C4C4C4C4C			482	DC CL20'ME	•	00003300
001460	D4C5D5C540404040			483	CC CL20'MERE	•	00003310
001474	D4C5D5C7D3E84C4C			484	DC CL20'MERELY	•	00003320
001488	D4C9C7C8E3404040			485	DC CL20'MIGHT	•	00003330
00149C	D4D6D9C5404C4040			486	DC CL20'MORE	•	00003340
001480	D4D6D9C7D6E5C9D5			487	CC CL20'MOREOVER	•	00003350
0014C4	D4D6E2E3404040C0			488	DC CL20'MOST	•	00003360
0014D8	D4E4C3C1C4C4C4C0			489	CC CL20'MUCH	•	00003370
0014EC	D4E4E2E34C4C4C4C			49C	CC CL20'MUST	•	00003380
001500	D4E8D4C4C4D4D4D4			491	DC CL20'MY	•	00003390
001514	D4E8E2C5D3C84C4C			492	CC CL20'MYSELF	•	00003400
001528	D5C5C1D9D3E84C4C			493	DC CL20'NEARLY	•	00003410
00153C	D5C5C5C4404040C0			494	CC CL20'NEED	•	00003420
001550	D5C5C5C4C5C4C4C4			495	CC CL20'NEFCEC	•	00003430
001564	D5C5C5C4E2C4D4D4			496	DC CL2C'NEEDS	•	00003440
001578	D5C5C5E3C8C5D54C			497	DC CL20'NEITHER	•	00003450
00158C	D5C5E3C5D5C4C4D0			498	CC CL20'NEVER	•	00003460
0015A6	D5C5E3C5D6D3C8C5			499	DC CL2C'NEVERTHELESS	•	00003470
0015B4	D5C5E7E3D4C4D4C			500	CC CL20'NEXT	•	00003480
0015C8	D5C5D5C54C4C4C40			5C1	CC CL20'NINE	•	00003490
0015DC	D5D4C4C4D4C4D4D0			502	CC CL20'NO	•	00003500
0015F0	D5D4D5C54C4C4040			503	CC CL20'NONE	•	00003510
001604	D5D6D4C4D4C4C4C			504	DC CL20'NOP	•	00003520
001618	D5D6E3D4D4C4D4D0			505	DC CL20'NOT	•	00003530
00162C	D5D4E3C8C5D5C74C			506	DC CL20'NOTHING	•	00003540
001640	D5D6E3E6C9E3C8E2			5C7	DC CL20'NOTWITHSTANDING	•	00003550
001654	D5D6E4C4D4C4D4D0			508	DC CL20'NOW	•	00003560
001668	D5D6E8C8C5D5C540			509	CC CL20'NOWHERE	•	00003570
00167C	D6C4D4D4D4C4D4D0			510	DC CL20'OF	•	00003580
001690	D6C6C4C4C4C4D4D0			511	CC CL20'OFF	•	00003590
0016A4	D6C8E3C5D5C4C4C			512	CC CL20'OFTEN	•	00003600
0016B8	D6D7D4D4D4C4D4D0			513	CC CL20'OK	•	00003610
0016CC	D6D5C4C4C4C4D4D0			514	CC CL20'ON	•	00003620
0016E0	D6D5C3C5C4C4C4C4			515	DC CL20'ONCE	•	00003630
0016F4	D6D5C5D4D4D4D4D0			516	DC CL20'ONE	•	00003640
001708	D6D5D3E8C4C4C4C4			517	DC CL20'ONLY	•	00003650
00171C	D6D5E3C6D4C4D4D0			518	DC CL20'ONTO	•	00003660
001730	D6D9C4C4C4C4D4D0			519	CC CL20'OR	•	00003670
001744	D6E3C4C5D5C4C4D0			520	CC CL20'OTHER	•	00003680

FIGURE V-: (CONTINUED)
KWOC-I PROGRAM LISTING

LOC	OBJECT CODE	ADDR1	ADDR2	STMT	SOURCE STATEMENT		F30SEP69 6/17/70
001750	D6E3C8C9C9E24040			521	DC CL20'OTHERS	*	00003690
001760	D6E3C8C9D5E6C9E2			522	CC CL20'OTHERWISE	*	00003700
001780	D6E4D54C4C4C4040			523	CC CL20'OUR	*	00003710
001794	D6E4D5E2404040			524	DC CL20'OURS	*	00003720
0017A8	D6E4E3404C4C4040			525	CC CL20'OUT	*	00003730
0017BC	D6E4E3E2C9C4C54C			526	DC CL2C'OUTSIDE	*	00003740
0017D0	D6E5C5D94040404040			527	DC CL20'OVER	*	00003750
0017E4	D6E5C5D5C3C6C4C5			528	CC CL20'OVERCOME	*	00003760
0017F8	D6E5C5D9C3E2404040			529	DC CL20'OVERLY	*	00003770
001800	D6E6D5404C4C4C40			530	CC CL20'OWN	*	00003780
001820	D6E6D5C6D5C74C4C			531	DC CL20'OWNING	*	00003790
001834	D6E6D5E2404C4040			532	DC CL20'OWNS	*	00003800
001848	D7C1D9C3C3E4404C			533	CC CL20'PARTLY	*	00003810
00185C	D7C5D5C4C5C5C740			534	CC CL20'PENDING	*	00003820
001870	D7C5D54040404040			535	CC CL20'PER	*	00003830
001884	D7C5D9C8C1D7E240			536	CC CL20'PERHAPS	*	00003840
001898	D7D9E2E2C9C3C3C5			537	DC CL2C'POSSIBLE	*	00003850
0018AC	D7E4E3404040404040			538	CC CL20'PUT	*	00003860
0018C0	D8E4C9C3D24C4C4C			539	CC CL20'QUICK	*	00003870
0018D4	D8E4C9C3C2C3E840			540	DC CL20'QUICKLY	*	00003880
0018E8	D8E4C5E3C54C404C			541	DC CL20'QUITE	*	00003890
0018FC	D9C1E3C8C5D54C4C			542	DC CL2C'RATHER	*	00003900
001910	D9C5C1C4C9C3E840			543	DC CL20'READILY	*	00003910
001924	D9C5C1D3D3E84040			544	CC CL20'REALLY	*	00003920
001938	D9C5C7C1D5C44040			545	CC CL20'REGARD	*	00003930
00194C	D9C5D3C1E3C54040			546	CC CL2C'RELATE	*	00003940
001960	D9C5E2E4D3E34040			547	CC CL20'RESULT	*	00003950
001974	D9C5E3E4D5C54C40			548	DC CL20'RETURN	*	00003960
001988	E2C1C5C4404040404040			549	DC CL20'SAID	*	00003970
00199C	E2C1D4C54C4C4040			550	CC CL20'SAME	*	00003980
0019B0	E2C1E3404C4C4C40			551	DC CL20'SAT	*	00003990
0019C4	E2C1E5C54C4C4040			552	DC CL20'SAVE	*	00004000
0019D8	E2C1E5C5C44C4C4C			553	DC CL20'SAVED	*	00004010
0019EC	E2C1E5C5E2404040			554	DC CL20'SAVES	*	00004020
001A00	E2C1E44C4C4C4040			555	CC CL20'SAW	*	00004030
001A14	E2C1E8404C4C4040			556	CC CL20'SAY	*	00004040
001A28	E2C1E8E2404040404040			557	DC CL20'SAYS	*	00004050
001A3C	E2C5C54C4040C4040			558	CC CL20'SEE	*	00004060
001A50	E2C5C5D44C4C4040			559	DC CL20'SEEM	*	00004070
001A64	E2C5C5D4E2404040			560	DC CL20'SEEMS	*	00004080
001A78	E2C5C5D54C4C4040			561	CC CL20'SEEN	*	00004090
001A8C	E2C5C5E2404C4C4C			562	DC CL20'SEES	*	00004100
001AA0	E2C5E5C3D54C4C40			563	DC CL20'SEVEN	*	00004110
001AB4	E2C5E5C3D5C1D340			564	CC CL20'SEVERAL	*	00004120
001AC8	E2C8C1C3C3404040			565	DC CL20'SHALL	*	00004130
001ADC	E2C8C54C4C4C4040			566	CC CL20'SHE	*	00004140
001AF0	E2C8D4E4D3C44C4C			567	CC CL2C'SHOULD	*	00004150
001B04	E2C8D46D5404040			568	DC CL20'SHOWN	*	00004160
001B18	E2C9D5C3C54C4C40			569	CC CL20'SINCE	*	00004170
001B2C	E2C9E3404C4C4040			570	DC CL20'SIT	*	00004180
001B40	E2C9E3E24C404040			571	DC CL20'SITS	*	00004190
001B54	E2C9E3E3C5C5C74C			572	CC CL20'SITTING	*	00004200
001B68	E2C9E74C4C4C4040			573	DC CL20'SIX	*	00004210
001B7C	E2D44C4C4040C4C40			574	DC CL20'SO	*	00004220
001B90	E2D404C54C4C4C4C			575	CC CL2C'SOME	*	00004230

FIGURE V-1 (CONTINUED)
KWOC-I PROGRAM LISTING

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001BA4 E2D6D4C9E3C8C9C5          576          DC    CL20'SOMETHING'                    00004240
CC1BB8 E2D6C4C5E3C9C4C5          577          DC    CL20'SOMETIME'                     00004250
001BCC E2D6D6D5C4C4C4C0          578          DC    CL20'SOON'                         00004260
001BE0 E2E3C9D3C3D5C4D6          579          DC    CL20'STILL'                        00004270
001BF4 E2E3D6D6C4C4C4D6          580          DC    CL20'STOOD'                        00004280
001C08 E2E4C3C8C4C4C4C4          581          DC    CL20'SUCH'                         00004290
001C1C E2E4D5C5D4D4D4D0          582          DC    CL20'SURF'                         00004300
001C30 E3C1D3C5C4C4C4C4          583          DC    CL20'TAKE'                         00004310
001C44 E3C1D3C5D5C4C4C0          584          DC    CL20'TAKEN'                        00004320
001C58 E3C1D3C5E2C4C4D0          585          DC    CL20'TAKES'                        00004330
001C6C E3C1D3C9D5C7C4C0          586          DC    CL20'TAKING'                       00004340
001C80 E3C5D5C4C4D4D4D0          587          DC    CL20'TEN'                          00004350
001C94 E3C8C1D5C4C4D4D0          588          DC    CL20'THAN'                         00004360
001CA8 E3C8C1E3C4C4C4C4          589          DC    CL20'THAT'                         00004370
001CBC E3C8C5D4D4D4D4D0          590          DC    CL20'THE'                          00004380
001CD0 E3C8C5C9D5C4C4D4          591          DC    CL20'THEIR'                        00004390
001CE4 E3C8C5D4C4C4C4C4          592          DC    CL20'THEM'                         00004400
001CF8 E3C8C5D4E2C5E3C5          593          DC    CL20'THEMSELVES'                   00004410
CC1D0C E3C8C5D5C4C4C4C4          594          DC    CL20'THEN'                         00004420
001D20 E3C8C5C5C5C4C4D4          595          DC    CL20'THERE'                        00004430
001D34 E3C8C5D9C5E2E8D4          596          DC    CL20'THEREBY'                      00004440
001D4B E3C8C5D9C5C4D6D5          597          DC    CL20'THEREFORE'                    00004450
001D5C E3C8C5D9C5C9C9D4          598          DC    CL20'THEREIN'                      00004460
CC1D70 E3C8C5E2C5C4C4D4          599          DC    CL20'THESE'                        00004470
001D84 E3C8C5E4C4C4C4D4          600          DC    CL20'THEY'                         00004480
001D98 E3C8C9E2D4C4D4D4          601          DC    CL20'THIS'                         00004490
001DAC E3C8D4E2C5C4C4D4          602          DC    CL20'THOSE'                        00004500
001DC0 E3C8D6E4C7C8C4C0          603          DC    CL20'THOUGH'                       00004510
001DD4 E3C8D9C5C5D4D4D4          604          DC    CL20'THREE'                        00004520
001DE8 E3C8D9D6E4C7C8C4          605          DC    CL20'THROUGH'                      00004530
001DFC E3C8E4E2C4C4D4D4          606          DC    CL20'THUS'                         00004540
001E10 E3C9D4C5E2C4D4D4          607          DC    CL20'TIMES'                        00004550
001E24 E3D4C4C4C4C4D4C4          608          DC    CL20'TO'                           00004560
001E38 E3D6C7C5E3C4C5C9          609          DC    CL20'TOGETHER'                     00004570
001E4C E3D6D4D4D4C4D4D0          610          DC    CL20'TOO'                          00004580
001E60 E3D6D4D2C4C4C4C0          611          DC    CL20'TOOK'                         00004590
001E74 E3D6D6C1C5C4D4D0          612          DC    CL20'TOWARD'                       00004600
CC1E88 E3D9C5C5C4C4D4D0          613          DC    CL20'TRIED'                        00004610
001E9C E3D9E4C4C4C4C4C4          614          DC    CL20'TRY'                          00004620
001EB0 E3E6D6D4D4D4D4D0          615          DC    CL20'TWO'                          00004630
001EC4 E4D5C4C5D5C4C4C4          616          DC    CL20'UNDER'                        00004640
001ED8 E4D5C4C5C5C7C6D0          617          DC    CL20'UNDERGO'                      00004650
001EEC E4D5C4C5D5C5C9C1          618          DC    CL20'UNDERNEATH'                   00004660
001F00 E4D5D3C5E2E2D4D0          619          DC    CL20'UNLESS'                       00004670
001F14 E4D5E3C5C3D4D4D0          620          DC    CL20'UNTIL'                        00004680
CC1F28 E4D7D4D4C4D4D4D0          621          DC    CL20'UP'                           00004690
001F3C E4D7D6D5C4C4C4C0          622          DC    CL20'UPON'                         00004700
001F50 E4E2D4D4C4C4C4D0          623          DC    CL20'US'                           00004710
CC1F64 E4E2C5D4C4C4D4D0          624          DC    CL20'USE'                          00004720
001F78 E4E2C4D5C7C4C4C4          625          DC    CL20'USING'                        00004730
001F8C E4E2E4C3C1D3D4D0          626          DC    CL20'USUAL'                        00004740
CC1FA0 E4E2E4C3D3C3E4C4          627          DC    CL20'USUALLY'                      00004750
001FB4 E5C1D9C9C8C8E2D0          628          DC    CL20'VARIOUS'                      00004760
CC1FC8 E5C1D9E4C4C4D4D0          629          DC    CL20'VARY'                         00004770
001FDC E5C5D4E2E4E2D4C4          630          DC    CL20'VERSUS'                       00004780
```

FIGURE V-I (CONTINUED)
KWOC-I PROGRAM LISTING

```
  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                    F 30SEP69  6/17/70

001FF0 E5C5D9E8404C4040              631         DC    CL20'VERY            *          00004790
002CC4 E5C9C14C4C4C404C              632         CC    CL20'VIA             *          00004800
002010 E5E24C4C4C4C4C40              633         CC    CL20'VS              *          00004810
00202C E6C1D9E340404040              634         CC    CL20'WANT            *          00004820
002040 E6C1E24040404040              635         DC    CL20'WAS             *          00004830
002C54 E6C54C4040404040              636         DC    CL20'WE              *          00004840
002068 E6C5D5E340404040              637         DC    CL20'WENT            *          00004850
00207C E6C5D9C24C4C404C              638         CC    CL20'WERE            *          00004860
002090 E6C8C1E3404C404C              639         DC    CL20'WHAT            *          00004870
002084 E6C8C1E3C5E5C9C9              640         DC    CL20'WHATEVER        *          00004880
002CB8 E6C8C5D34C4C4C4C              641         CC    CL20'WHEN            *          00004890
002CCC E6C8C5C5C5E5C5D9              642         DC    CL20'WHENEVER        *          00004900
002080 E6C8C5D9C54C4040              643         CC    CL20'WHERE           *          00004910
002094 E6C8C5D9C3C1E24C              644         CC    CL20'WHEREAS         *          00004920
002108 E6C8C5D9C5C28840              645         CC    CL20'WHEREBY         *          00004930
002116 E6C8C5D9C5C40609              646         CC    CL20'WHEREFORE       *          00004940
002130 E6C8C5D9C5C5D540              647         DC    CL20'WHEREIN         *          00004950
002144 E6C8C5D9C5C6C440              648         DC    CL20'WHEREOF         *          00004960
002158 E6C8C5D9C5E5C5D5              649         CC    CL20'WHEREVER        *          00004970
00216C E6C8C5E3C8C3C54C              650         DC    CL20'WHETHER         *          00004980
002180 E6C8C9C3C8C4C4C4              651         CC    CL20'WHICH           *          00004990
002194 E6C8C9C3C8C3E5C5              652         CC    CL20'WHICHEVER       *          00005000
0021A8 E6C8C9D3C5404040              653         DC    CL20'WHILE           *          00005010
0021BC E6C8D4C4C4C4C040              654         CC    CL20'WHO             *          00005020
0021D0 E6C8D6D3C54C4C40              655         CC    CL20'WHOLE           *          00005030
0021E4 E6C8D6D3D3E84040              656         CC    CL20'WHOLLY          *          00005040
0021F8 E6C8D6D4C4C4C040              657         CC    CL20'WHOM            *          00005050
00220C E6C8D6E2C3C4C4C4              658         DC    CL20'WHOSE           *          00005060
002220 E6C8E6C4C4C4C040              659         DC    CL20'WHY             *          00005070
002234 E6C9D3D34C4C4C4C              660         CC    CL20'WILL            *          00005080
002248 E6C9E3C8404C4C40              661         DC    CL20'WITH            *          00005090
00225C E6C9E3C8C5E3404C              662         DC    CL20'WITHIN          *          00005100
002270 E6C9E3C8C6E4E34C              663         CC    CL20'WITHOUT         *          00005110
002284 E6D6D5E340404040              664         DC    CL20'WONT            *          00005120
002298 E6D6E4D3C44C4040              665         CC    CL20'WOULD           *          00005130
0022AC E8C5E24C4C4C4C4C              666         CC    CL20'YES             *          00005140
0022C0 E8C5E34C4C4C4C40              667         CC    CL20'YET             *          00005150
0022D4 E8D6E44C4C4C4040              668         CC    CL20'YOU             *          00005160
0022E8 E8D6E4D54C4C4040              669         DC    CL2C'YOUR            *          00005170
0022FC E8D6E4D9E2C4C040              670         CC    CL20'YOURS           *          00005180
002310 E8D6E4D9E2C3C3C4              671         CC    CL20'YOURSELF        *          00005190
000000                               672         END   BEGIN                            00005200
```

FIGURE V-I (CONTINUED)
KWOC-I PROGRAM LISTING

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PCS-ID	REL-ID	FLAGS	ADDRESS
01	01	08	000015
01	01	0E	CCCC19
01	01	0E	C0C145
01	01	08	000151
01	01	0E	000361

FIGURE V-1 (CONTINUED)
KWOC-I PROGRAM LISTING

6/17/70

SYMBOL	LEN	VALUE	DEFN	REFERENCES					
ADCBR	000C4	00C136	CC108						
BEGIN	000C2	0CCCCC	00036	0072					
BLANK	00002	0002C0	00140	0033	0044				
BLANORD	CC020	00C1C4	CC147	0048	0091	0100			
CARC	00080	000125	CC133	0038	0090				
CLEAR	000C6	000040	00046						
CLRANORD	000C6	0CC116	CC1CC	0075	0088	0092			
COLOR	00001	0C02C2	0C141	0C81					
CCLAT	00004	000408	00271	0086					
DATAOUT	00125	CCC1A8	00132	0044	0047	0047	0093	0094	0097
DUPPY	00002	00C2E4	0C143	0051					
ENDRAM	000C2	00C3C8	CC135	0052	0045				
EQUALS	000C1	0CC2D2	0C142	0083					
FCUR	00002	0002CA	00137	0055					
INDCB	CC0C4	0CC340	00159	0027	0037	0116			
LNAME	00C81	0CC272	CC134	005C	0C51	C057	CC94		
LCADTAB	00004	0000C8	00089	0082					
LOOP	C00C4	00CC5E	0CC52	0068	0077	0109			
MAINLINE	000C4	00002A	00027	0054	CC56	C072	0103	0105	0107
MCVAAP	000C6	000052	00050						
MOVARD	C00C4	0CCC4C	0CC71	0C56	C061				
NEARLY	00002	0CC2C8	0C136	0102					
ON	00004	0000E8	00078	0053	0064	0075			
ONE	000C2	0CC2CE	CC135	0063	0067	0073	0074	0076	0078	0108
OUTCCB	000C4	0CC3A0	0C214	0C25	0096	0122			
RDECP	CCCC4	0CC140	C0114	0178					
SAVEAREA	C00C4	0CC14C	CC130	002C	0021	0124			
SAPSUB	00004	000C54	00047						
SPACE	0CC80	0CC1FE	0C149						
STCR	0CCC4	0CCCE2	0CCE2						
STCRLAST	000C6	000CF2	00091	0084					
TABLE	00020	0CC4CC	00274	0085					
TABLOOP	00006	0C0CEC	0CC87	009C					
WORC	00020	0002EA	00148	0048	00e2	008C	0C87	0091	0093	0100
ZERO	C00C2	0CC3CC	0C138	0071					

NO STATEMENTS FLAGGED IN THIS ASSEMBLY
STATISTICS SOURCE RECORDS (SYSIN) = 533 SOURCE RECORDS (SYSLIB) = 2211
OPTIONS IN EFFECT LIST, DECK, NOLOAD, NORENT, XREF, NOTEST, ALGN, OS, LINECNT = 55
612 PRINTED LINES

FIGURE V-I (CONCLUDED)
KWOC-I PROGRAM LISTING

```
 LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F30SEP69  6/17/70

                                     2 *                                                                00000020
000000                               3          CSECT                                                   00000030
                                     4 BEGIN    SAVE  (14,12)                                           00000040
000000                               5*BEGIN    CSECT ON
000000 90EC D00C             0000C   6*         STM   14,12,12(13) SAVE REGISTERS
000004 05C0                          7          BALR  12,0                                              00000050
000006                               8          USING *,12                                              00000060
000006 5000 C19E             001AA   9          ST    13,SAVEAREA+4                                     00000070
00000A 4100 C19A             001A0  10          LA    13,SAVEAREA                                       00000080
                                    11          PRINT NOGEN                                             00000090
                                    12          OPEN  (CARDCB,,PRNTDCB,(OUTPUT))                        00000100
000012 4820 C23E             00244  22          LH    2,ONE          SWITCH FOR FIRST HEADING           00000110
000016 1B33                         23          SR    3,3                 * * * * * * *                 00000120
000018 1844                         24          SR    4,4                 *         *                   00000130
00001A 1855                         25          SR    5,5                 *  CLEAR  *                   00000140
00001C 1866                         26          SR    6,6                 * REGISTERS *                 00000150
00001E 4870 C23E             00244  27          LH    7,ONE        SWITCH FOR FIRST USE OF NEW FIRST CHARACTER 00000160
000022 1888                         28          SR    8,8                 * * * * * * *                 00000170
000024 1899                         29          SR    9,9                                               00000180
000026 4390 C23C             00242  30          IC    9,ALPHA              INSERT 'A' IN REG. 9         00000190
00002A 4840 C23E             00244  31          LH    10,ONE                                            00000200
                                    32 *  REG. 10 IS USED AS A SWITCH                                   00000210
00002E 4180 C232             00238  33          LA    8,NOPRINT          LOAD ADDRESS OF RECORD SUPPRESS 00000220
                                    34 *                                   CHARACTERS                   00000230
                                    35          GET   CARDCB,CARD                                       00000240
                                    40 *                                 READ PARAMETER/DATE CARD       00000250
                                    41 *                                      DATE IN CC. 1-20          00000260
                                    42 *                                      SUPPRESSION CHARACTERS IN 21-27 00000270
                                    43 *                                      WITH NO EMBEDDED BLANKS   00000280
                                    44 *                                                                00000290
000032 4130 C1F6             001FC  45          LA    3,CARD+20          LOAD ADDRESS OF 1ST CHARACTER   00000300
000036 9540 3000             00000  46 LOOP1     CLI   0(3),X'40'         COMPARE CHARACTER WITH BLANK    00000310
00003A 4780 C06C             00072  47          BE    EXIT1                  BRANCH IF IT IS.           00000320
                                    48 *                                                                00000330
00003E D200 8000 3000 0000   00000  49          MVC   0(1,8),0(3)        MOVE SUPPRESS CHARACTER TO NOPRINT 00000340
000042 4A60 C23E             00244  50          AH    6,ONE              ADD 1 TO CHARACTER COUNT        00000350
000046 4A30 C23E             00244  51          AH    3,ONE              ADD 1 TO INDEX FOR CARD         00000360
00004A 4A80 C23E             00244  52          AH    8,ONE              ADD 1 TO INDEX  FOR NOPRINT     00000370
00004E 47F0 CC4E             00054  53          B     LOOP1              GET NEXT CHARACTER              00000380
000052 406C C240             00246  54 EXIT1    STH   6,CCUNT       STORE COUNT FOR LOOP COUNTER       00000390
000056 D200 C2C1 C23C 002C7  00243  55          MVC   TOPLINE(1),BLANK          INSERT BLANK IN HEADING LINE; 00000400
00005C D25A C2C2 C2C1 0C2C8  002C7  56          MVC   TOPLINE+1(91),TOPLINE     PROPAGATE BLANKS THRU FIELD; 00000410
000062 D213 C21C C1E2 CC222  0C1E8  57          MVC   TOPLINE+91(20),CARD       PUT DATE IN HEADING         00000420
000068 4130 C232             00238  58          LA    3,NOPRINT                                         00000430
00006C 1888                         59          SR    8,8                                               00000440
00006E 47F0 C138             00136  60          B     HEADING                  PRINT FIRST HEADING      00000450
                                    61 *                                                                00000460
                                    62 LOOP     GET   INDCB,INAREA             GET A RECORD             00000470
000070 4960 C242             00248  67          CH    6,ZERO         CHECK TO SEE IF ANY SUPPRESS CHARACTERS 00000471
000074 4780 C08C             000C2  68          BE    INSERT                                            00000472
000078 D500 300C C244 CCCCC  00C4A  69 TESTCHAR CLC   0(1,3),INAREA        COMPARE FIRST CHARACTER OF RECORD 00000480
                                    70 *                                   WITH EACH SUPPRESS CHARACTER 00000490
00007E 4780 CC8C             00092  71          BE    LOOP                                              00000500
                                    72 *                                                                00000510
000082 4A30 C23E             00244  73          AH    3,ONE          INCREMENT ADDRESS IN REG.3         00000520
```

FIGURE V-2
KWOC-2 PROGRAM LISTING

```
LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                    F30SEP69  6/17/70
CCCCB4 4660 C0A2            00AA    74           BCT   6,TESTCHAR        BRANCH BACK IF COUNT NOT COMPLETE   00000530
                                    75 *                                                                    00000540
CCCCB8 4860 C240            0024A   76           LH    6,CCUNT                                             00000550
CCCCBC 4130 C232            00238   77           LA    3,NOPRINT                                           00000560
                                    78 *                                                                    00000570
                                    79 *                                  IF RECORD IS TO BE PRINTED, TEST  00000580
CCCCC2 4340 C244            00240   80 INSERT    IC    4,INAREA          TO SEE WHETHER FIRST CHARACTER IS TO 00000590
                                    81 *                                  BE REPLACED WITH A BLANK FOR PRINT 00000600
CCCCC6 1594                         82           CLR   9,4                                                 00000610
                                    83 *                                CHARACTERS < A WILL BE BLANKED.     00000620
CCCCC8 4780 C1E4            001AA   84           BE    FIRST                                               00000630
CCCCCC 4760 C0EE            000EE   85           BNE   MOVE                                                00000640
                                    86 *   IF 1ST CHAR. IS A OR HIGHER IN COLLATING SEQUENCE, SKIP TO MOVE 00000650
                                    87 *   THE FIRST 'A' REQUIRES A PAGE SKIP FOR SEPARATING LISTINGS       00000660
                                    88 *                                                                    00000670
CCCCD0 4670 C23E            0C244   89 TESTPRNT  CH    7,ONE     IS IT FIRST TIME FOR THIS FIRST CHARACTER? 00000680
CCCCD4 4770 C0D6            0000C   90           BNE   SUB                                                 00000690
CCCCD8 4340 C244            00240   91           IC    8,INAREA          STORE THIS AS NEW FIRST CHARACTER  00000700
CCCCDC 1877                         92 SUB       SR    7,7                                                 00000710
CCCCDE D200 C244 C230 00240 00243   93 BLANKIT   MVC   INAREA(1),BLANK                                     00000720
                                    94 *                              PUT BLANK IN FIRST PRINT POSITION     00000730
CCCCE4 1540                         95           CLR   4,0                                                 00000740
                                    96 *                                AS LONG AS CHARACTER DOESN'T CHANGE, 00000750
CCCCE6 4780 CCEE            000EE   97           BE    MOVE          CONTINUE.                             00000760
                                    98 *                                                                    00000770
                                    99 *                                  SKIP TO NEW PAGE                  00000780
CCCCEA 47F0 C172            C0178  100           B     NEWLIST                                             00000790
                                   101 *                                                                    00000800
CCCCEE D26E C370 C244 C0336 00240  102 MOVE      MVC   OUTAREA(111),INAREA                                 00000810
                                   103 *   TEST FOR PRINTER OVERFLOW ON NEXT PRINT LINE.  IF OVERFLOW WILL  00000820
                                   104 *   OCCUR, SKIP TO HEADING, START NEW PAGE, AND RETURN TO PRINT.     00000830
                                   105           PRTOV PRNTCCB,12,HEADING                                  00000840
                                   121 PRINT     PUT   PRNTCCB,OUTAREA                                     00000850
CCC13A 47F0 C08C            00092  126           B     LOOP                                                00000860
                                   127 *                                                                    00000870
                                   128 HEADING   CNTRL PRNTDCB,SK,1                                        00000880
                                   134           PUT   PRNTDCB,TOPLINE                                     00000890
CCC15C 4920 C23E            0C244  139           CH    2,ONE           TEST SWITCH                         00000900
CCC160 4770 C0EB            CC0EE  140           BNE   MOVE            R.2 WILL BE 1 FOR FIRST HEADING     00000910
CCC164 1822                        141           SR    2,2             THEREAFTER, ZERO.                   00000920
CCC166 47F0 CC8C            00092  142           B     LOOP                                                00000930
                                   143 *                                                                    00000940
CCC16A 1888                        144 FIRST     SR    8,8                                                 00000950
CCC16C 1585                        145           CLR   10,8                                                00000960
CCC16E 4780 C0EB            000EE  146           BE    MOVE                                                00000970
CCC172 18AA                        147           SR    10,10                                               00000980
CCC174 47F0 C13B            CC13E  148           B     HEADING                                             00000990
CCC178 4870 C23E            00244  149 NEWLIST   LH    7,ONE           RESET NEW FIRST CHARACTER SWITCH    00001000
CCC17C 1888                        150           SR    8,8                                                 00001010
CCC17E 47F0 C13B            CC13E  151           B     HEADING                                             00001020
                                   152 *                                                                    00001030
                                   153 RCEOF     CLOSE (CARDCCB,,INDCB,,PRNTDCB)                           00001040
CCC19A 5800 C19E            001AA  163           L     13,SAVEAREA+4                                       00001050
                                   164           RETURN (14,12)                                            00001060
                                   167 *                                                                    00001070
```

FIGURE V-2 (CONTINUED)
KWOC-2 PROGRAM LISTING

```
  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F 30SEP69   6/17/70
000180                              168            DS    0F                                                  00001080
000180                              169 SAVEAREA   DS    18F                                                 00001090
0001E8                              170 CARD       DS    CL80                                                00001100
000238                              171 NOPRINT    DS    CL8                                                 00001110
000240 0049                         172 DUMMY      DC    XL2'49'                                             00001120
000242 C1                           173 ALPHA      DC    CL1'A'                                              00001130
000243 40                           174 BLANK      DC    CL1' '                                              00001140
000244 0001                         175 ONE        DC    H'1'                                                00001150
000246                              176 COUNT      DS    H                                                   00001160
000248 0000                         177 ZERO       DC    H'0'                                                00001161
00024A                              178 INAREA     DS    CL125                                               00001170
0002C7 4040404C404C4040             179 TOPLINE    DC    CL111' '                                            00001180
000336                              180 OUTAREA    DS    CL111                                               00001190
                                    181 CARDDCB    DCB   DDNAME=CARD02,DEVD=RD,DSORG=PS,EODAD=RDEOF,         X00001200
                                                         LRECL=80,RECFM=FB,BLKSIZE=80,MACRF=(GM)             00001210
                                    237 *                                                                    00001220
                                    238 INDCB      DCB   BFALN=F,BFTEK=S,BLKSIZE=6250,DDNAME=QUICOUT,DEVD=DA, /00001230
                                                         DSORG=PS,EROPT=SKP,EODAD=RDEOF,LRECL=125,MACRF=(GM), /00001240
                                                         RECFM=FB                                            00001250
                                    294 *                                                                    00001260
                                    295 PRNTDCB    DCB   BFALN=F,BFTEK=S,DSORG=PS,PRTSP=1,BLKSIZE=1110,DEVD=PR, /00001270
                                                         DDNAME=CDPRINTG,LRECL=111,MACRF=(PMC),RECFM=FB,EROPT=SKP 00001280
                                    351            END                                                       00001290
```

FIGURE V-2 (CONTINUED)
KWOC-2 PROGRAM LISTING

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PCS-ID	REL-ID	FLAGS	ADDRESS
01	C1	CE	000015
C1	C1	CE	CC0019
01	C1	CE	CCCC1D
01	01	08	000189
C1	C1	CE	CCC18D
01	01	CE	C00191
01	C1	08	000389
C1	C1	CE	000419

FIGURE V-2 (CONTINUED)
KWOC-2 PROGRAM LISTING

6/17/70

SYMBOL	LEN	VALUE	DEFN	REFERENCES									
ALPHA	000C1	000242	00173	003C									
BEGIN	000C2	CCCCCC	0CCC5										
BLANK	00001	000243	00174	0055	0093								
BLANKIT	C0CC6	CCCCDE	CCC53										
CARD	00080	0CC1E8	00170	0037	0045	C057							
CARDDCB	000C4	0CC3E8	00186	0016	0036	0157							
CCUNT	CC0C2	CCC24E	0017E	0054	0076								
DUMMY	00002	000240	00172										
EXITI	CCCC4	CCCC72	00054	00-7									
FIRST	000C2	00C16A	00144	CC94									
HEADING	00004	00013E	00129	0060	0119	0148	0151						
INAREA	00125	0CC24A	00178	0064	0069	0080	0091	0093	0102				
INDCB	C00C4	0CC3F8	0C243	0C1E	0C63	C159							
INSERT	00004	0000C2	00080	0068									
LOOP	CCCC4	0CCC52	CCCE3	0C71	0126	0142							
LOOP1	000C4	00CC14	0CC46	0053									
MOVE	000C6	0000EE	00102	0085	0097	0140	0146						
NEWLIST	000C4	0CC178	CC149	010C									
NOPRINT	000C8	000238	00191	0033	0058	0077							
ONE	0CCC2	0C0244	0C175	0022	0027	0031	0050	0051	0052	0073	0089	0139	0149
OUTAREA	00111	000236	0C18C	0102	0123								
PRINT	00004	000120	00122										
PRNTDCB	000C4	0CC448	C0300	0020	0106	0115	0122	0129	0135	0161			
READEOF	C00C4	C0C1E4	0C155	0205	0262								
SAVEAREA	00004	000180	00169	0009	0010	0163							
SUB	C00C2	CCCCDC	00252	CC9C									
TESTCHAR	00006	0CC2A8	0CC65	0074									
TESTPRNT	000C4	0000D0	00089										
TOPLINE	00111	CCC2C7	0C175	0055	0056	C056	0057	0136					
ZERO	00002	0CC248	00177	0C67									

NO STATEMENTS FLAGGED IN THIS ASSEMBLY
STATISTICS SOURCE RECORDS (SYSIN) = 132 SOURCE RECORDS (SYSLIB) = 2330
OPTIONS IN EFFECT LIST, DECK, NOLOAD, NORENT, XREF, NOTEST, ALGN, OS, LINECNT = 55
189 PRINTED LINES

FIGURE V-2 (CONCLUDED)
KWOC-2 PROGRAM LISTING

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